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#1 Atari Computer Magazine

# Antic®

The ATARI® Resource

JULY 1985 VOLUME 4, NUMBER 3




## COMPUTER CHALLENGES

Atari Chess
SSI Wargame Commander
Four Type-In Games
DOS 2.5 to the Rescue!
Mapping Atari 130XE

E: 8 Type-In Programs



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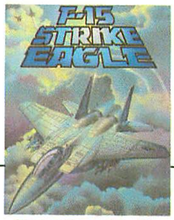


Commodore-64 Screen Picture

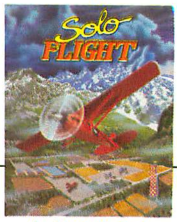
Voice Communications coming in from all directions!! 20 Aircraft in the pattern, and now you have an EMERGENCY!! As "Kennedy Approach", YOU are in charge!! It's your job to get all these aircraft and passengers on the ground or on the way safely!! You'll really be glad when this shift is over!!

"Kennedy Approach" is the first "Speaking Simulation" that allows you not only to control the exciting action in the skies around some of our busiest airports but also to hear and communicate with the simulation aircraft using computer generated speech. Fast action, great aircraft control simulation, and outstanding graphics and sound make "Kennedy Approach" a must addition to your simulation software library!! **SEE YOUR LOCAL RETAILER** for "Kennedy Approach". Available for Commodore-64 and Atari computers for suggested retail of only $34.95. For more information on all MicroProse products call or write.

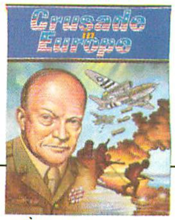
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YOU are in Command — D-Day to the Battle of the Bulge!!

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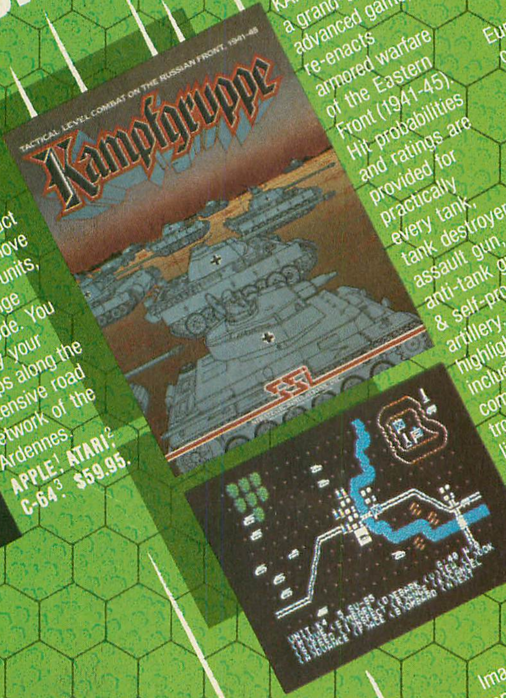
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BREAKTHROUGH IN THE ARDENNES™ is truly one of the finest simulations of the Battle of the Bulge. As battle commander, you can build up or break down regiments and divisions, allocate corps artillery, conduct airstrikes, move and fortify units, and change unit mode. You supply your troops along the extensive road network of the Ardennes. APPLE[1], ATARI[2], C-64[3]. $59.95.




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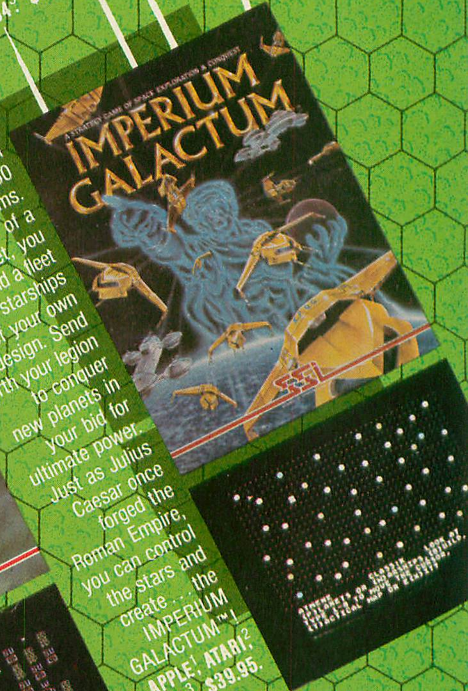

In FIELD OF FIRE™, you lead the legendary Easy Company of the 1st Infantry Division across North Africa and Europe in eight of their historical battles. Dividing your company into 6-men fireteam units, you'll direct a night raid and the storming of Omaha Beach on D-Day! Three levels of difficulty are provided. ATARI[2], C-64[3]. $39.95.




In September 1944, Montgomery launched a massive airborne/ground assault to cross the great rivers of Holland into Germany. Historically, the operation failed. But our OPERATION MARKET GARDEN™ is a gaming success. From the authors of the award-winning "Knights of the Desert"™. Contains both Advanced and Intermediate Games. APPLE[1], ATARI[2], C-64[3]. $49.95.




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Imagine an expanse of 50 star systems. As master of a planet, you command a fleet of starships of your own design. Send forth your legion to conquer new planets in your bid for ultimate power. Just as Julius Caesar once forged the Roman Empire, you can control the stars and create . . . the IMPERIUM GALACTUM™! APPLE[1], ATARI[2], C-64[3]. $39.95.

[1] On 48K diskette for the Apple II with Applesoft ROM, Apple II+, IIe, and IIc.
[2] On 48K diskette for Atari Home Computers.
[3] On 64K diskette for the Commodore 64.

SSI™

[1] APPLE is a registered trademark of Apple Computer, Inc.
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[3] C-64 (Commodore 64) is a trademark of Commodore Electronics, Ltd.



If there are no convenient stores near you, VISA & M/C holders can order directly by calling **800-227-1617, ext. 335 (toll free)**. In California, call 800-772-3545, ext. 335. Please specify computer format, and add $2.00 for shipping and handling.

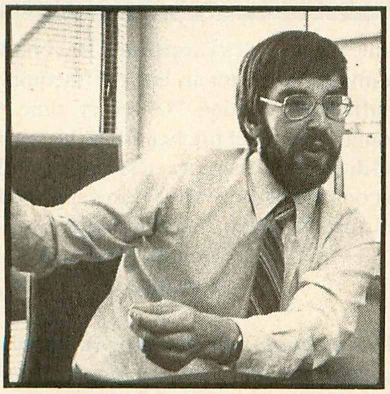
To order by mail, send your check to: STRATEGIC SIMULATIONS, INC., 883 Stierlin Road, Bldg. A-200, Mountain View, CA 94043. (California residents, add 7% sales tax.) All our games carry a "14-day satisfaction or your money back" guarantee.

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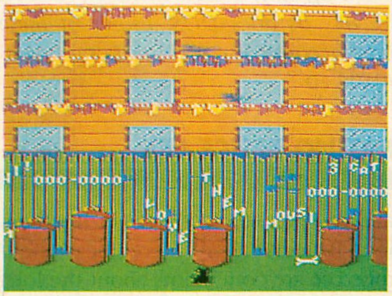
# Antic®

The ATARI® Resource

JULY 1985, VOLUME 4, NUMBER 3



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## DEPARTMENTS



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# i/o board

*We wish we could personally answer every letter from our readers, but* **ANTIC** *Magazine and CompuServe ANTIC ONLINE receive far too much mail to make this possible. Our priority must be to answer in print (and online) questions that are of greatest interest to a significant number of readers!*

## 600XL EXTINCTION?

As a concerned owner of the 600XL, I'd like to know what happened to it. Will there be a 64K expansion module from Atari? I hope Atari doesn't forget the thousands of 600XL owners.

Steve Bowen
Penobscot, MA

*Although Atari is not planning to produce more 600XL's, it is not a totally extinct machine. With the 64K expansion module, available from Microbits Peripheral Products, it is a viable computer. In fact, we use one daily at* **Antic.** —ANTIC ED

## SYNCALC MARCHES ON

I want to congratulate you on the February article about taxes and SynCalc. The template was so useful that I adapted it for state and local taxes as well.

N. Clark
Lansing, MI

*Thank you for the kudos.* **Antic** *is currently looking for more SynCalc templates. We'd like to see templates for Adjustable Rate Mortgages and for Long Distance Phone Service Cost comparisons. If you have such, please send it on a disk along with a short note about your finance credentials.* —ANTIC ED

## SOFTWARE REBATE

Datasoft recently informed us of a special rebate they're offering through August 31, 1985. Specially marked software packages will include $5 rebate coupons. The software in the offer includes **Bruce Lee, Conan, Dallas Quest, PacMan, Dig Dug, Pole Position, Mr. Do, Zaxxon, Letter Wizard.**

## ATARI AMNESIA

While playing SSI's **Computer Baseball** on my 800XL, I got an Error 2 (memory insufficient) on line 705 every time I brought in a relief pitcher. I ran the Atari self-diagnostic memory test and found that only 40 of the 48 little boxes appeared and turned green. Can you help?

Dennis Possi
Singapore

*We don't know why this program is filling your memory, but you might try the memory diagnostic with the disk drive turned off and BASIC disabled. BASIC uses 8K, as does DOS. Either of these could account for your missing boxes.* —ANTIC ED

## BEATING BRUCE LEE

Have you people out there got the blues about Bruce Lee? All I ever hear about Bruce Lee are complaints about the long introduction. Didn't anyone ever hear about the [SPACE] key? It's the long, skinny key at the bottom of the keyboard. Press it, and BINGO! the introduction ends.

Also, if you find that you don't have enough "free guys", then when you get to the room where you get the first free, keep running in and out of the room and frees will appear the first five times you do this.

Evan Gold
Brooklyn, NY

*We assure you that* **Antic** *pressed the [SPACE] bar and everything else on the Atari keyboard not once but many times in our vain attempt to escape from Bruce Lee's smiling face. Apparently you are lucky enough to own a later version of the game which allows you to avoid the introduction. Wanna trade?*—ANTIC ED

continued on page 8

# LOTSABYTES CONTINUES THE WAR!

**WAR** on high prices! We're going to put an end to the software price 'ripoff'. And **YOU** can help! Just keep those orders coming while you continue to enjoy the **quality, quantity, selection** and **low prices** that you deserve. Our National Public Domain Copy Service will save you time, tedious work, and money. And our **exclusive** distribution of **sharply discounted** commercial programs will bring you some of the finest programs for the lowest possible price, usually 50% and more off retail! You continue to get **FREE BONUSES** with each purchase of three or more disks.

## PUBLIC DOMAIN SOFTWARE

| #1 GAMES | #2 UTILITIES | #3 AMS MUSIC | #4 GAMES | #5 EDUCATION |
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| Two full disk sides packed with over 25 games including some Arcade quality. | 25 powerful programs to help you get the most out of your Atari computer. | 25 Advanced Musicsystem files including a new Player program. 2 sides. | All different! 14 more better games on 2 disk sides. Some Arcade types. | Loaded with 28 programs on 2 disk sides Fun learning for the whole family. |
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## LotsaBytes EXCLUSIVES

### ADVANCED MUSICSYSTEM II
*by LEE ACTOR*

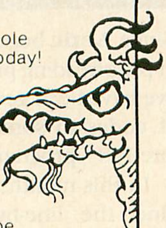


Allows you to create music with your Atari computer! All new machine code.
- Control over pitch duration, envelope dynamic level, meter, tempo and key.
- 4 independent voices
- 5½ octaves per voice
- Save up to 8200 notes
- Custom DOS
- FULL instructions
- 24K disk

*Originally $29.95* **Only $14.95**

### ORIGINAL ADVENTURE
*by Bob Howell*

For all Atari computers. The Original Colossal Cave Adventure faithfully reproduced from the main-frames'. This is the one that launched the whole Adventure craze of today!



- Two mazes
- 130 rooms
- Deadly Dragons
- Nasty Dwarves
- Tenacious Troll
- The Pirate & More!
- 86 coded hints
- SAVE RESUME
- 40K disk or 32K tape

*Originally $24.95* **Only $14.95**

### QUALITY WORD PROCESSING

**ESI WRITER!** At last a brand-new Word Processor that has more features and is easier to use than anything else available for the Atari. Easy for the beginner to use, it asks questions and remembers the answers. ESI WRITER is so sophisticated that it has many more features we don't even have room to mention! Works with ANY Atari.

- Reads any text file
- Built in Help screen
- Very fast!
- Works with ANY printer
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- Print headers etc.
- Block delete etc.
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- Over 50 pages of docs and tutorials

*TRUST US ON THIS ONE! YOU WILL LOVE IT!*

*Originally $49.95* **LotsaBytes price $19.95**

### ** FREE BONUSES **

**Now for each 3 disks ordered you may choose any 1 of the following disks FREE!!**

... buy 3 - get 1, buy 6 - get 2, buy 9 get 3 ...

a. The Atari XL TRANSLATOR DISK that enables XL owners to use most 400/800 software. **FREE!!**

-- or --

b. An all different AMS MUSIC disk with Player. **FREE!!**

--or--

c. Your choice of one of the P.D. disks -- #1, #2, #3, #4, #5, #6, #7, #8, #9, or #10 (specify one) **FREE!!**



### MUSIC MAJOR!

Learn the basics of music with this light-hearted but very thorough approach. Covering such topics as note recognition, key signatures, note counting, and much more, it is designed for use by both the individual student and music class.

This program includes a thoroughly illustrated manual and offers a QUIZ MASTER utility that allows the teacher or the self-taught student to create their own A-B-C-D type tests, with a sample quiz included.

*Originally $39.95* ***Only $14.95***

* * * *

### GREAT GAMES!

**SPACE GAMES:** Three games for **one** low price!. In **Aliens** you can't get them all and the pace keeps getting faster. When you do get rid of most of them, you are left in a space quadrant peppered with mines. Will you **Survive**? If you do, you must penetrate the alien's spaceship, survive a **Robot Attack**, and get back your stolen 'cloaking' device! Interested?

*$24.95 list* ***LotsaBytes price:* $9.95**

**THE BEAN MACHINE** by Steve Robinson is an Award Winning Arcade game that will drive you crazy balancing a series of beams while trying to get all the beans to roll down, without touching, all the while avoiding 'strange creatures' who drop in to steal the beans. It's addicting!

*$24.95 list* ***LotsaBytes price:* $9.95**

**DIGGERBONK**, another Award Winning game by Steve Robinson, challenges you to find your way through a continuously scrolling maze while avoiding some really strange creatures. Along the way you will need to Bonk some of them, but watch out for the bombs.

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**GUESS WHAT'S COMING TO DINNER** lets you try to manuever a snake through 7 levels if you can keep it from starving or being electrocuted. Lots of surprises! One or two players.

*$24.95 list* ***LotsaBytes price:* $9.95**

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### CREATIVE LEARNING ADVENTURES
***Ages 4 to 10 — Disk only***

**1.** Hours of **educational** fun playing 3 exciting creative adventures with a friendly alien learning about our planet Earth. Hand/eye co-ordination, drawing, and music skills are emphasized.

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**2.** Four challenging learning games that are the favorites of our friendly alien. Helps your child to develop logical reasoning ability.

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**3.** These 3 Fun-Day learning games will help with intellectual development, hand/eye co-ordination, logic, spatial, and analytical abilities.

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# LOTSABYTES

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# JUNE ANTIC ONLINE
## Exclusive CES Coverage

### SPINNAKER RESPONDS

*This letter from the chairman of Spinnaker Software came in response to the May 1985 **Antic** editorial recommending that readers write to software companies that don't convert hit programs for the Atari.*—ANTIC ED

I would like to clarify a few of the issues surrounding software development for the Atari.

The decision of which machines to support with software is never simple. Before bringing a new title to market, we weigh the growth factors (how well will the machine sell?), the market factors (will those owners be interested in our software?), and the economic factors (how much will it cost us to develop a title for that machine?).

I can assure you that the decision is one of the most difficult we face in developing software, and it is never made lightly.

With this year's introduction of the new Atari machines, the decision takes a new turn. We are talking, right now, with Atari about developing products for the new Atari machines. Such develoment would make it more economically feasible to support both ends of the Atari line.

I would like Antic readers to know that we at Spinnaker do understand their needs, and that we're working hard to provide them with the best product on the market. We have, in the past, supported all of our customers with a wide variety of exciting new titles every year, and we will continue to do so.

Please encourage your readers to write. We always appreciate our customers' interest.

William Bowman
Chairman, Spinnaker Software

### THE FORTH DIMENSION

The FORTH Interest Group (you guessed it, FIG) recently announced its author recognition program. For more information on this 4,800-member non-profit organization, contact FIG's hotline, (415) 962-8653, or write to them at P.O. Box 1105, San Carlos, CA 94070.

Type GO ANTIC when you log onto CompuServe in June, and you'll be able to read our on-the-spot bulletins direct from the Consumer Electronics Show in Chicago—with all the details about the new Atari products being showcased.

Not only that, you will also find an extensive preview of our groundbreaking August **TeleComputer** issue. You'll see descriptions—or even actual excerpts—from upcoming August articles that are must reading for anybody who uses a modem (or who plans to start using one).

For example, **HomeTerm** programmer Russ Wetmore tells you how to get more power out of the inexpensive **1030 Modem**. There's a type-in terminal program with hot new features. Another type-in program makes it easy to create animated cartoons on a BBS or on your own home screen.

The latest TeleComputing products for Atari will be reviewed. And when you log onto ANTIC ONLINE, you can always expect to find the latest news and information about the Atari world—including the most recent developments for the 16-bit **ST** computers.

From most areas, there are no long distance charges when you log onto CompuServe, and there are never any charges for ANTIC ONLINE besides the standard hourly CompuServe connect fee.

ANTIC ONLINE Special Bulletins may be downloaded for reprinting in newsletters of user groups affiliated with the Worldwide Users Network. Officers of unaffiliated groups should write to the WUN coordinator at **Antic** for details.

# help!

### MANEUVER AND HEARTS

If you're finding blue hearts all over your **Maneuver** title screen (**Antic**, April, 1985) LIST the program to disk or cassette, type NEW, then re-ENTER it and SAVE it.

### SG-10 FONT MAKER

Those with the new Gemini SG-10 printers may have discovered that **Font Maker** (**Antic**, March, 1985) will not work on these printers. Help is here.

First, set DIP switch 1–5 on your SG-10 to OFF and then type in the **Font Maker Modification** listing that you'll find in this month's Listing Section, page 59.

LIST the modification to disk, type NEW, LOAD the original **Font Maker** program, then ENTER the **Modification**. Finally, SAVE the entire modified program. (Those confused between LIST and SAVE should see "Why You Want DOS 2" in **Antic**, April, 1985.)

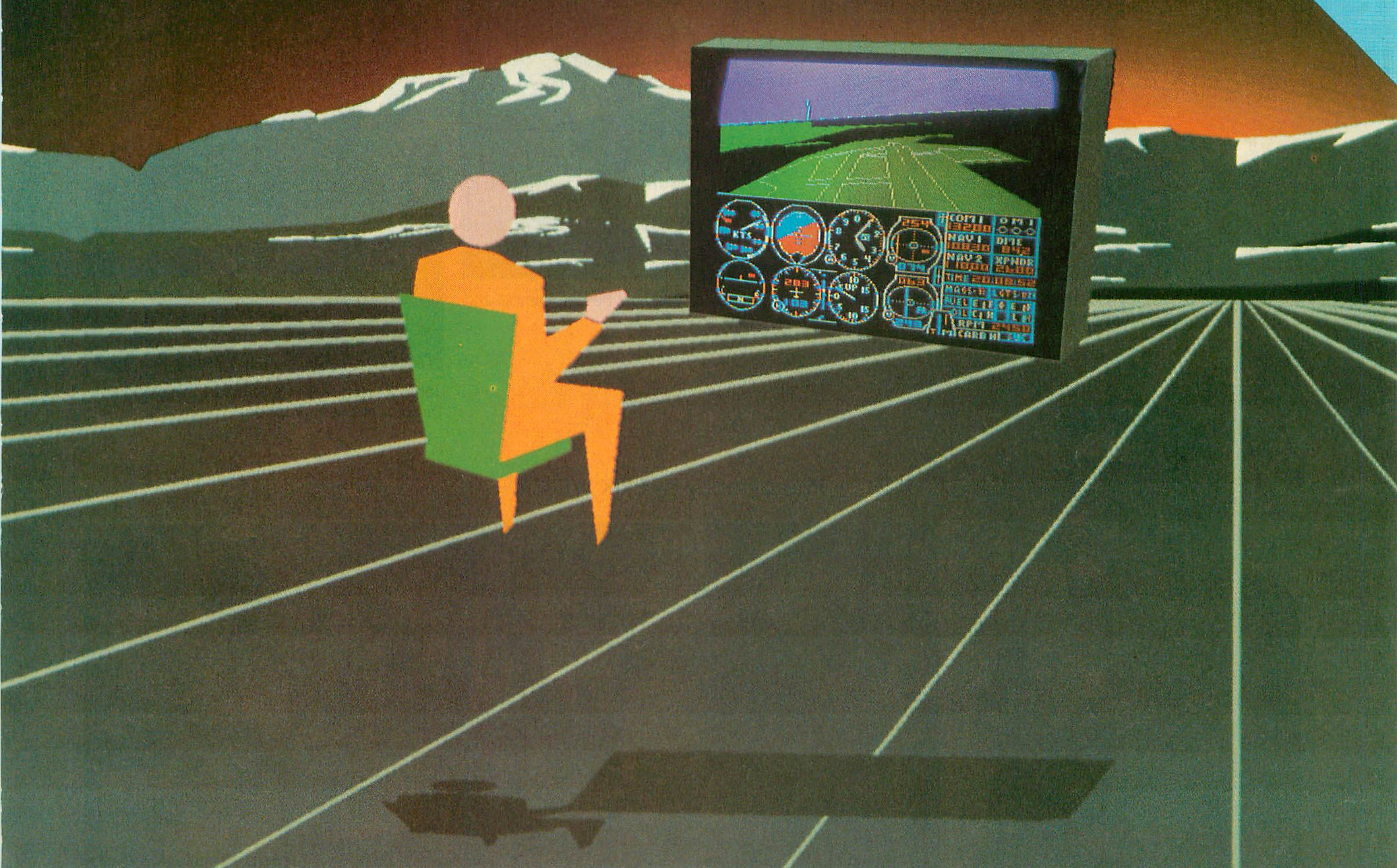
### TYPO II UPDATES

Since **Antic** began using the new TYPO II proofreading program in January 1985, we have been getting requests for TYPO II codes to some of the most popular pre-1985 programs.

In this months' Listing Section, you'll find the line-by-line codes—just the codes—for "Biffdrop," "Escape from Epsilon," "Advent X-5," and "Adventure Island." We'll print additional TYPO II updates if we get enough requests. Enjoy.

# Flight Simulator II

**For Atari computers with 48K memory**



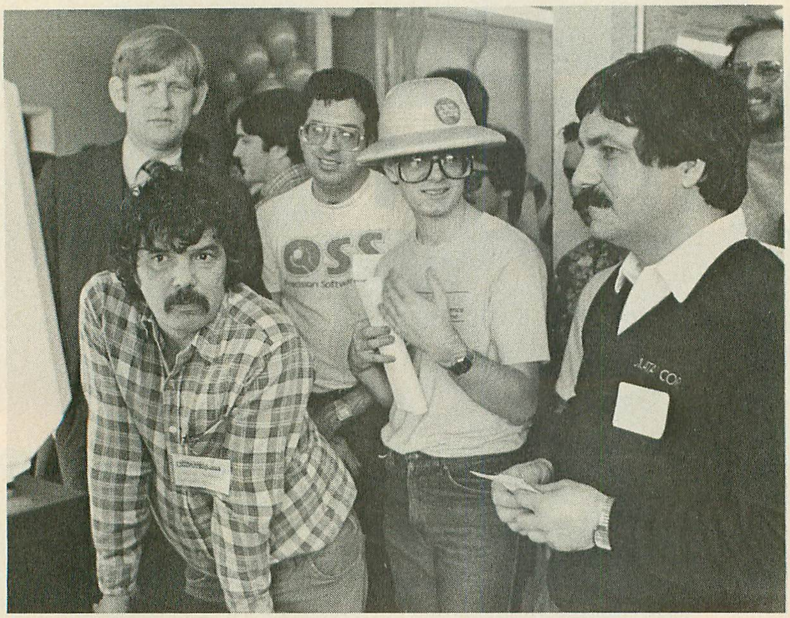
Put yourself in the pilot's seat of a Piper 181 Cherokee Archer for an awe-inspiring flight over realistic scenery from New York to Los Angeles. High speed color-filled 3D graphics will give you a beautiful panoramic view as you practice takeoffs, landings, and aerobatics. Complete documentation will get you airborne quickly even if you've never flown before. When you think you're ready, you can play the World War I Ace aerial battle game. Flight Simulator II features include ■ animated color 3D graphics ■ day, dusk, and night flying modes ■ over 80 airports in four scenery areas: New York, Chicago, Los Angeles, Seattle, with additional scenery areas available ■ user-variable weather, from clear blue skies to grey cloudy conditions ■ complete flight instrumentation ■ VOR, ILS, ADF, and DME radio equipped ■ navigation facilities and course plotting ■ World War I Ace aerial battle game ■ complete information manual and flight handbook.

***See your dealer . . .***

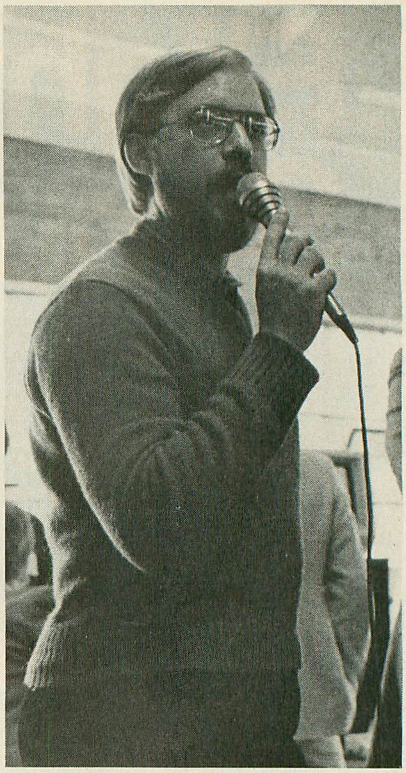
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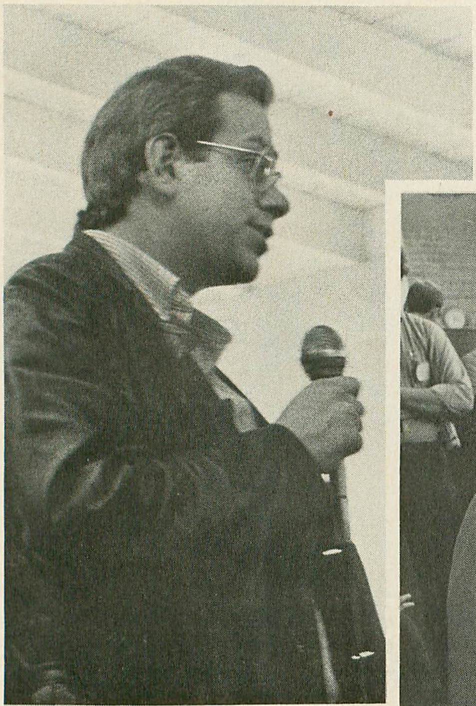
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Antic's 520ST is demonstrated by Richard Frick (front right), Atari ST Software Development Director. That's Antic Contributing Editor Ken Harms at rear left.



John Scrutch, Atari XE Software Development Director at the microphone.



Atari Engineering Vice President Tom Brightman answers questions.

Photography by ERIK WEBER



Professor Joseph Lyons demonstrates the Virtuoso music generator, using Antic's 130XE computer to control four Casio CZ-101 synthesizers.

# ANTIC ANNIVE

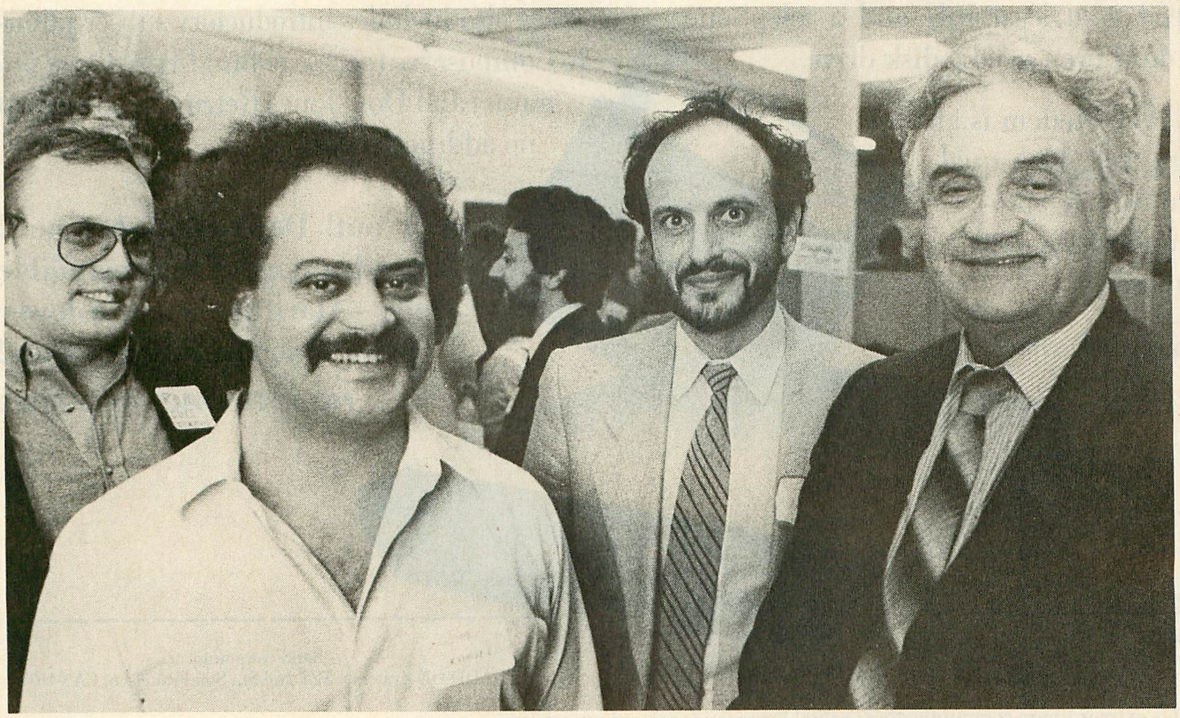
## *Atari world comes to Antic's party and*



Some of the crowd at the Worldwide Users Network Inaugural Meeting.

Cutting the birthday cake for 250 guests is Antic Art Director Marni Tapscott.





From left: Ron Luks, Antic Online Editor; Sam Tramiel, President of Atari Corp.; Antic Publisher James Capparell; Sig Hartmann, President of AtariSoft division.

# RSARY ALBUM

## *Worldwide User Network start-up meeting*

# DUCKS, SEAHORSES AND MUPPETS

## New educational software

Reviewed by Anita Malnig

In **Big Bird's Funhouse** (CBS) the Sesame Street Muppets Bert and Ernie, Cookie Monster, Grover, Oscar, etc. are all hiding in a funhouse. The child must guess who's hiding where. Big Bird lets you know if you've guessed correctly. You must use a soft plastic overlay on the keys to indicate special squares for the child to push. This doesn't fit very well and tends to slide around.

At each of the five levels, the play is essentially the same. You hit some keys. A window in the funhouse will pop up and you see a Muppet character. Then you hit the hide key, the character disappears and you try to remember which characters are still around. Each character has his own musical theme which the child will come to recognize along with the character himself. (All the Muppets here are male.)

At the first two levels the empty open windows will be clues as to how many Muppets are missing. Later on all the windows are open and empty. Later still, you guess the order in which the characters appear. The animation and music when the Muppets are hiding is funny and lively but the graphics seemed a little fuzzy. So many educational programs are achieving superb quality in their graphics that one can't help but be somewhat disappointed by the slightly off-register resolution here.

But the graphics are less of a disappointment than the fact that this is essentially a skimpy, one-theme program. I think that even pre-school children would get tired of the repetitive gameplay rather quickly.

However, right on the money is **Ducks Ahoy!** published by CBS Software and developed by Joyce Hakansson Associates in Berkeley, California.

You're in Venice and in your gondola you must pick up ducks who want to go to the beach. You maneuver your boat through the canals and pick up ducks at the doorways of the various buildings. Then you take them up to the beach. But, you've got to avoid the hippo who upsets boats and get to the door of each building before the comically waddling ducks plop themselves into the water. The ducks don't quite know how to stop. You've got to have the boat waiting for them.

The graphics are crisp, the waddling ducks are very amusing and the music charmingly duplicates an Italian song, such as a gondolier might play!

The ducks do move in a pattern (after you play a while you begin to pick it up). You must determine how long it will take you to steer the boat to pick them up in time. You can pick up two in a row and take them both to the beach, but you must be sure you'll avoid the hippo. Ten ducks on the beach wins a game.

This simple, clever game can help young children with their fine motor coordination and counting skills. Older children can work on planning the most efficient routes and predicting the outcome of the game.

I've seen kids thoroughly involved with this game—and believe me, it can capture the parents' attention too! While this is also a one-theme program, it becomes an engaging adventure. Short, clear documentation accompanies the software, as well as a story book with duck jokes and activities such as making duck feet and duck lips! Lots of fun!

Also from Joyce Hakansson Associates for CBS is **Sea Horse Hide 'n' Seek**. Here you must maneuver your seahorse through a coral reef as it encounters old wrecks and seaweed. You also must guide it away from the lagoon fish who let out a special sound so you know they're coming.

This program teaches about some of the real properties of sea horses.

continued on next page

They use camouflage to hide. You steer your sea horse to a large piece of coral and it will assume the color of the coral.

Your goal is to get the sea horse home by crossing the reef. And it's quite an adventure to do so. A child playing this will have fun avoiding the lagoon fish, changing colors and hiding, and in the bargain learn something about underwater life.

Both Ducks Ahoy and Sea Horse Hide 'n' Seek are 16K cartridges, so they can be used on any Atari without a disk drive or cassette.

**Muppet Learning Keys** was produced by Jim Henson Assocates and Koala Technologies. This Keyboard is designed for use by young children who have difficulty mastering the standard computer keys.

On the Muppet Keys, letters are set out in a five-row square in their regular A-B-C- sequence. The numbers are arranged to look like a ruler. There are other keys— Stop, Go, Erase and Zap!—which all have funny cartoon markings and perform special functions.

With the use of an adapter disk you can run your other software for your child to play with via the Muppet Keys. But the special games for the keyboard now available on Apple and Commodore are not out for the Atari.

And when I tried to run other popular software on an 800XL with the Muppet Keyboard in place, the programs all crashed. I've spoken with people at Koala who assure me this is not supposed to happen. Be sure and try your child's favorite games with this keyboard at the store before you make a purchase.

**BIG BIRD'S FUNHOUSE**
$34.95, 48K disk, ages 3–6

**DUCKS AHOY!**
$12.95, 16K cartridge, ages 3–6

**SEA HORSE HIDE 'N' SEEK**
$12.95, 16K cartridge, ages 3–6

CBS Software
1 Fawcett Place
Greenwich, CT 06836
(203) 622-2525

**MUPPET LEARNING KEYS**
$79.95, 64K disk, ages 3–6

Koala Technologies Corp.
3100 Patrick Henry Drive
Santa Clara, CA 95052
(408) 986-8866

# eight new Synapse games

## synapse merges with Broderbund

by JACK POWELL,
**Antic** Technical Editor

Eight Synapse action games for Atari have just been released—six of them in 2-for-1 packages priced at $24.95 — marking the completed merger of Synapse Software and Broderbund Software.

Contracts for the purchase of Synapse by Broderbund were actually signed in October, 1984. But details of the agreement between two of the top independent producers of Atari software only now have become available.

Some months before the purchase, Synapse came into financial difficulties. They had an exclusive distribution agreement with Atari for the business application series **SynFile+**, **SynCalc** and **SynTrend**. After Jack Tramiel bought Atari, he took the position that the contract was not binding on the new owners. Synapse stopped getting payments and filed a lawsuit.

The owners of Synapse and Broderbund had been close friends since the early days of home computers. A merger between the two Northern California companies seemed natural. The possibility had been discussed even before the SynApplications disaster.

Some changes at Synapse were immediate. Jon Loveless, formerly vice president of marketing, became acting president, and Brian Lee was named director of product development. Synapse president Ihor Wolosenko became—and remains—creative consultant for the two companies.

### PHASED MERGER

For six months, Synapse continued to operate as a separate entity while agreements were worked out on how to shape the merging companies.

Starting in January 1985, Broderbund took over all Synapse operations except for research and development of new products, which remains at the original Synapse facility in Richmond, California..

Jon Loveless turned down a position as director of sales at Broderbund and became president of a venture capital firm. Brian Lee—a familiar face at Atari users group meetings in the San Francisco Bay Area—became director of the Synapse Division of Broderbund.

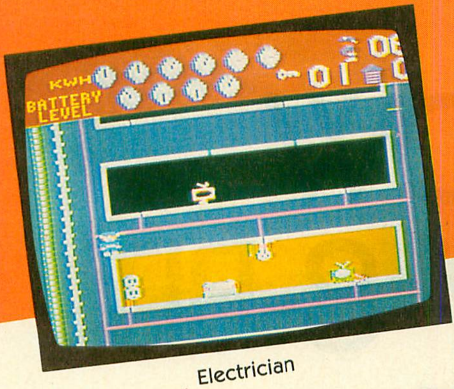
Broderbund says it is determined to retain the distinctive personality of the Synapse product line. It knows that Synapse is strong where Broderbund is weak and vice-versa. All Synapse products will retain the Synapse name and continue to be developed by Synapse programmers.

Customer service will continue with no interruption, according to both Synapse and Broderbund. The phone number on current Synapse packages remains valid. In fact, the only immediate noticeable change will be the addition of the Synapse line to the Broderbund catalog.

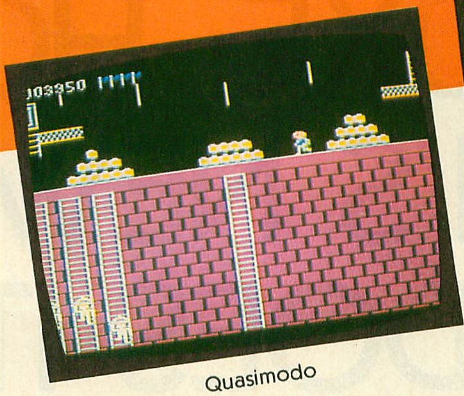
### STRONGER NOW

What does all this mean for the future? Well, **Antic** is optimistic about the possibilities.

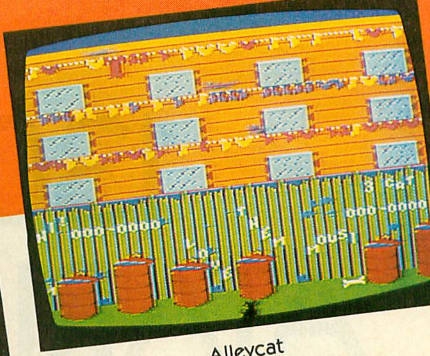
Broderbund has always developed



Electrician



Quasimodo



Alleycat

Apple products first, porting its programs over to the Atari later. Synapse is one of the best of the independent Atari software producers. Each company produces polished, highly distinctive software and it should be fascinating to watch how they influence one another.

For example, Synapse has spent many months developing a sophisticated parser for adventure games, which will be seen in the upcoming "Electronic Novels" series. (See "Coming Adventures", **Antic**, November 1984.) Now Broderbund will also be using this tool to produce all-text adventure games.

A more immediate boon is the *eight* new Synapse games for Atari which have just been released.

Six of the eight games are being released as "Double Plays" — which means you get two games for only $24.95. And these are not inferior games!

Only one of the Double Play games, **Rainbow Walker** is not brand new. (It was reviewed in the September 1984 **Antic**.) Two new games are being released as singles— **Blue Max 2001** (a lot of gamesters have been waiting for this one!) is $29.95 and **Alley Cat** is $19.95.

## THE GAMES

Rainbow Walker is bundled with **Countdown**. Rainbow follows the colorful plight of Cedric as he jumps and leaves a rainbow puddle. Try to create a rainbow of colors as noxious critters undo your work.

Countdown lets you penetrate enemy missile silos and prevent the launch of a warhead aimed at your country's capital.

The noble successor to **Blue Max** is Blue Max 2001, which takes you into the future in a typical strafe-and-bomb aerial arcade game. Look for good graphics and a good challenge.

**New York City** is bundled with **Electrician**. Stuck in the Big Apple, you must successfully drive and walk between Central Park, City Hall, the Main Post Office and so on. Simply moving around is a challenge, and each station also contains an additional arcade puzzle.

Success in Electrician comes when you connect the wiring to each room in a building. This gives you a key to another building, located one maze away. You'll have to contend with spiders, bats, rats, alligators and other stock nasties.

The third double pack is **Quasimodo** and **Air Support**. Quasimodo puts you in the enviable role of the notorious hunchback as he defends his belfry from archers and bats.

Air Support gives you control of a helicopter in either an arcade or strategy game. You can set levels of troop strength, difficulty and so on.

Finally, there's Freddy the **Alley Cat**. In case you haven't lived in an alley before, there are dead fish to be collected in garbage cans, open windows to jump through, mad dogs and bad people to avoid. All this so Freddy can get to his sweetheart, Felicia.

# 130XE: HOW ATARI'S NEW 8-BIT DOES IT

## *XL compatibility plus 128K power*

by JACK POWELL, **Antic** Technical Editor

*Just before publication deadline, Atari released first specifications for their new 130XE computer. We wasted no time in passing along the most important points to technical-minded readers.*—ANTIC ED.

The 130XE provides its owner with 128K of system RAM. Since it is an 8-bit machine and therefore incapable of addressing more than 64K of memory, the extra 64K is accessed through selective bank switching.

Atari states that any software developed for the 130XE which does not use the extra RAM will be 100% compatible with their new 64K 8-bit 65XE computer. And of course the 65XE is being billed as 100% compatible with the 800XL model it replaces.

The announced differences between the 130XE and the 65XE are:

1. RAM capacity and organization.
2. Altered usage of the 6520 PIA (Parallel Interface Adaptor).
3. Increased power supply requirements. (1.2 amps at 5 VDC for the 130XE)
4. Enhanced Cartridge Interface.

Figure 1

**1. Compatibility mode:**

| VBE | CBE | BA1 | BA0 | CPU Access | Video Access |
|---|---|---|---|---|---|
| 1 | 1 | X | X | Main $4000-$7FFF | Main $4000-$7FFF |

**2. CPU Extended RAM mode:**

| VBE | CBE | BA1 | BA0 | CPU Access | Video Access |
|---|---|---|---|---|---|
| 1 | 0 | 0 | 0 | Exp $0000-$3FFF | Main $4000-$7FFF |
| 1 | 0 | 0 | 1 | Exp $4000-$7FFF | Main $4000-$7FFF |
| 1 | 0 | 1 | 0 | Exp $8000-$BFFF | Main $4000-$7FFF |
| 1 | 0 | 1 | 1 | Exp $C000-$FFFF | Main $4000-$7FFF |

**3. Video Extended RAM mode:**

| VBE | CBE | BA1 | BA0 | CPU Access | Video Access |
|---|---|---|---|---|---|
| 0 | 1 | 0 | 0 | Main $4000-$3FFF | Exp $0000-$3FFF |
| 0 | 1 | 0 | 1 | Main $4000-$7FFF | Exp $4000-$7FFF |
| 0 | 1 | 1 | 0 | Main $4000-$7FFF | Exp $8000-$BFFF |
| 0 | 1 | 1 | 1 | Main $4000-$7FFF | Exp $C000-$FFFF |

**4. Extended RAM mode:**

| VBE | CBE | BA1 | BA0 | CPU Access | Video Access |
|---|---|---|---|---|---|
| 0 | 0 | 0 | 0 | Exp $0000-$3FFF | Exp $0000-$3FFF |
| 0 | 0 | 0 | 1 | Exp $4000-$7FFF | Exp $4000-$7FFF |
| 0 | 0 | 1 | 0 | Exp $8000-$BFFF | Exp $8000-$BFFF |
| 0 | 0 | 1 | 1 | Exp $C000-$FFFF | Exp $C000-$7FFF |

The "Enhanced Cartridge Interface" (ECI) is the new parallel bus which will only be available on the 130XE. It's designed as an extension to the cartridge slot and Atari claims it "provides equivalent architectural functionality" to the PBI on the XL line. Whether it provides *physical* equivalence and, if not, whether hardware manufacturers will want to make double plugs for compatible hardware remains to be seen.

See *Figure 2* for a chart of ECI signals. No pin numbers were available at press time.

## TWO BANKS

The two 64K banks of memory in the 130XE are called the "main bank" and the "secondary bank." They are identical in layout and control capacity and may be accessed by either the 6502 or ANTIC microchips in various combinations, through manipulation of four previously unused flag bits in the 6520 PIA registers (beginning at $D300).

The first flag bit is the Video (ANTIC) Bank Enable which, when set to zero, enables video data fetches from the extended RAM. The second bit is the CPU Bank Enable. This allows CPU access of the secondary bank.

The secondary bank is approached through a 16K "access window" at locations $4000–$7FFF. At any one time, only one 16K "page" is accessible through this window. The final two new PIA bits are used to specify the chosen page address for the extra 64K bank.

These four bits, along with the ability of both the CPU as well as ANTIC to access the new RAM, provide some interesting combinations. There are four distinct modes of operation:

1. Compatibility mode.
2. CPU extended RAM.
3. Video extended RAM.
4. Extended RAM mode.

In CPU extended mode, only the CPU has access to the secondary bank, ANTIC sees the main bank. Keep in mind that any access to the extended RAM is only through the access window at $4000-$7FFF. In this mode, you could place your display lists and screen information in main memory and use extended RAM for program and data storage. No synchronization of bank addressing with display activity is required on the part of the programmer!

The Video extended RAM mode is essentially the reverse of the above. The secondary bank is accessed by ANTIC while it remains invisible to the CPU.

In Compatibility mode, both ANTIC and the CPU see the main bank. In Extended RAM mode, they both see the secondary bank. *Figure 1* shows how setting the PIA bits affects the CPU and ANTIC access for the various modes.

So what are you going to do with all this new stuff? A practical, applications-minded programmer could create quite a database program with this but as for me, I see an **Eastern Front** with an eight-way scrolling map that just won't quit!

Figure 2

### ENHANCED CARTRIDGE INTERFACE CONNECTOR

| | ECI Conn | Description |
|---|---|---|
| ----- | | |
| \| | A0-A12 | 1st 13 Address Lines. |
| \| | D0-D7 | System data bus. |
| \| | R/W* | Processor read/write. |
| \| | PHI2 | System clock. |
| present | +5V | DC power. |
| 30 pin | GND | Ground. |
| cart | S4 | Chip select $8000-9FFF. |
| conn | S5 | Chip select $A000-BFFF. |
| \| | RD4 | ROM present. |
| \| | RD5 | ROM present. |
| \| | CCTL | ROM bank control select. |
| ----- | | |
| \| | A13-A15 | Upper 3 Address Lines. |
| \| | REF | Present cycle is a refresh. |
| \| | MPD | Math pack disable. |
| \| | RESET* | System reset. |
| 14 pin | IRQ* | Interrupt request. |
| extension | AUDIO IN | External audio input. |
| \| | I/O1* | Chip select at D1XX. |
| \| | HALT* | ANTIC halt* signal. |
| \| | Extsel | External memory assertion. |
| \| | Reserved | Reserved signal line. |
| \| | GND | Second ground. |
| ----- | +5V | Second power. |

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## DESK SET $39.00

### Complete Desk Package

**CALENDAR**

CALENDAR is a perpetual calendar, an appointment calendar and also a card file. The perpetual calendar is a calendar of every month, past, present or future. The appointment calendar allows up to 15 entries to be made each day.

**CARD FILE**

The card file is a mail list program which holds up to 200 addresses. The printing format of card file includes continuous lists, labels or envelopes. Files can be printed; all the files from one file number to another; by zip code; by state or by selected files.

**LETTER WRITER**

LETTER WRITER is a preformatted letter writing program. LETTER WRITER can be used for any number of applications involving entering, editing and printing text. LETTER WRITER is designed to be easy to use and does not require extensive training. While LETTER WRITER is not a full word processing system, it performs 90% of the functions used by harder to use and more expensive word processors. DESK SET also contains a program that allows you to combine Card File and Letter Writer for interaction.

**FINANCIAL CALCULATOR**

FINANCIAL CALCULATOR answers virtually any questions concerning the cost of money, loans, and interest earned on savings, loans and investments. Plus, this program will give a complete interest earned table and amortization table. This program is a must for anyone serious about money.

**FORECASTER**

Forecast future events based on past information. Forecast profits, costs, sales trends, prices test scores, virtually anything. Edit, save on disk and test various elements to determine the outcome. FORECASTER is a powerful "what if" program – a must for business.

Two drive - double density - 48K required.

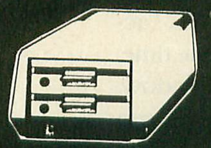
## HOME WRITER $19.00

The HOME WRITER is an easy to use word processor which includes a carefully selected group of functions that are at your disposal immediately. The functions are as follows: SAVE, LOAD, REVIEW, PRINT-OUT, or EDIT. All the popular editting features available on the ATARI Home Computer in direct programming mode are also available with HOME WRITER. You may also search for phrases or strings, load off of either disk or cassette, and number pages automatically. Unlike other small word processing programs, HOME WRITER does not wrap-around when at the end of a line. Right and left margin justification is available for any type parallel printer. 48K.

## ASTRA

### Double Disk Drives

True Double Density



Total Compatible

**INCLUDES DOS**

| | |
|---|---|
| Big "D" Double Sided | $595.00 |
| 2001 Two Drive | $495.00 |
| 1620 Two Drive | $349.00 |

1620 quantities are limited.

## SMARTDOS $39.00

- SMARTDOS is 100% density smart. SMARTDOS will sense the density of each disk in use and automatically reconfigure the entire system to that density.
- SMARTDOS does not require that a "system disk" has to remain in the drive, or be continually inserted and removed in order to use the DUP.SYS commands.
- With SMARTDOS you may Copy with query, (eliminates specifying each item individually).
- Counter screens – which keeps the user informed as to what the system is doing and where in the task the system is.
- Disk testing for bad or unusual sectors that may be corrected.
- RESIDUP feature allows simple yet powerful full time availability of DUP.SYS commands while leaving your program intact and ready to RUN.
- Minimum keystrokes for maximum power, e.g. a disk directory is done by pressing only one key – the drive number (great for filesearches, and "=" may be used to replace *.*.
- The ability to run from 1 to 9 autorun files sequentially.
- Built in disk drive speed check.
- SMARTDOS is only 34 single density sectors long and works with all Atari computers with a minimum of 24K RAM.

## FILING SYSTEM $19.00

FILING SYSTEM allows the user to configure any type of data file imaginable. Examples are recipe cards, mail lists, reminders for birthdays, check-ups, etc..., complete inventories (home and business), personnel files, customer call-ups, price list, and much, much more. You may retrieve data using any field or combination of fields. Files also may be saved, sorted, and printed in a preset format that you configure. Uses either a single or a double density disk drive. 24K minimum.

## LETTER SYSTEM $29.00

This disk contains both LETTER WRITER and MASTER LIST plus the necessary program that allows for combining the two programs for interaction. Call a file off disk, type a letter and (with the right printer) type on envelope, or just run one letter after another. All of the powerful features of both LETTER WRITER and MASTER LIST plus the ability to use them together.

Includes 35 pre-typed letters.

## BILLING/INVENTORY $49.00

BILLING allows you to do invoices, posts to account cards, deductions from inventory and payments. There are provisions for shipping, discounts, no charge items and tax. BILLING also allows maintenance for up to 500 customer files, and printing of the daily total of billings. A flowchart is given to show the step-by-step direction that the program takes. Allows for up to 300 inventory items. 48K.

## STAT-PLUS $29.00

STAT PLUS is the most powerful statistic tool we have seen. Run sample space, mean, variance and standard deviation. Do probabilities using binomial, poisson or normal distribution. Also, do students' t-test, Mann-Whitney U test and Chi Square. Do linear regressions; may use 1-12 independent variables, interact a sample from one module to another, edit, rank and print out. 24K min.

## ACCESSORIES

| | |
|---|---|
| Disk Doubler | $14.00 |
| 5' I/O Cable | $12.50 |
| 1' I/O Cable | $ 8.50 |
| Transformer | $18.50 |
| IBX 10 SS/DD Disks w/ plastic box | $14.50 |
| C-5 Data Cassette w/box | $ 2.49 |
| Disk Fix and Cleaning Kit | $29.00 |

## DEMONS DUNGEON $19.00

Queen Isidore's crown was stolen by the Demons that live in the deep terrifying dungeon. If the crown is not recovered the magic that protects her and the kingdom will vanish. Others have tried and died. Whoever recovers the crown and saves the kingdom will win the hand of the princess Ilena and the Kingdom.

**THE PROGRAMMERS WORKSHOP**

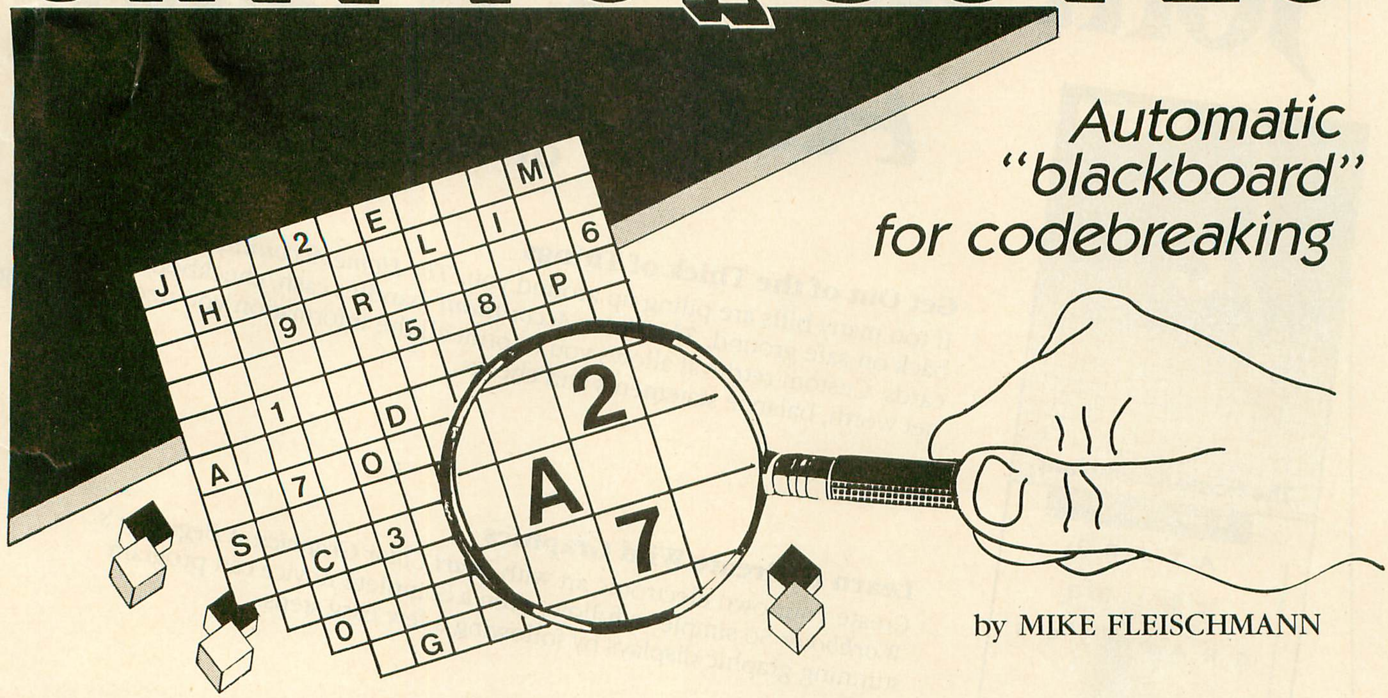
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# CRYPTOQUOTES



## Automatic "blackboard" for codebreaking

by MIKE FLEISCHMANN

*Now your Atari can remove a lot of erasing and tedium from solving code puzzles. Every time you enter a subsitute letter, you'll get a global replacement throughout the secret message. This BASIC program works on all Atari computers of any memory size, with disk or cassette.*

I'm a cryptoquote fan. I love to work over these nonsense letter groups trying to find their hidden meaning. You find cryptoquote word puzzles in many newspapers. They are sayings that have had their letters substituted with other letters. Let's say the word "THAT" appears as WFRW; the W stands for T, F for H, and R for A. You try to break the code and find out what the puzzle really says.

Solving cryptoquotes requires trying lots of letter combinations, and this means using lots of paper—or using this program.

### SOLVING PUZZLES

To solve these codes, you look for clues in the letter combinations and word groups. When you think you know what one word is, you write that word above its corresponding code letters. You then write those letters above their encoded counterparts throughout the rest of the cryptoquote.

If your word seemed to show that the letter W in the cryptoquote was really the letter T, you would search for every W and replace it with a T. This process then leads you to other clues, or to a conclusion that your guess was wrong.

### USING THE PROGRAM

Type in Listing 1, Check it with TYPO II and SAVE a copy. It will function as an automatic blackboard, looking for the letters and erasing entries.

You'll be asked to type in the cryptoquote, which will be displayed in inverse letters. To enter a guess, type the letter you want to change, a space and the letter you want to replace it with. The program will place your guessed letter above the letter to be changed. To erase a guess, type the cryptogram letter corresponding to the guess you want erased.

If you like this program, here are some modification ideas that you might try to work out.

1. Check the input to see if the letter you want as a replacement has been already used.

2. Allow for input of entire letter groups at a time, instead of single letter input.

3. Have the punctuation copied automatically to the replacement line.

4. Speed up the program.

5. Make a game out of the puzzle by installing a counter—try to solve the cryptoquote in as few moves as possible. Have the computer calculate the minimum possible moves.

I'll say goodbye with a cryptogram:

WXXA KGZO! BRJ JXG ERDQ BRFJ ERUUJ EXGCN NXKDTFW YEQNQ UGLLKQN.—YEG RGYEXC

Hint: Y is a T. Good luck.

*Mike Fleischmann is a professional programmer and digital design engineer from Sunset, Utah. His contributions to **Antic** include our current listing printout program.*

Listing on page 59.

# STAR VENTURE

by RONALD SAARI

*Newcomers to the Atari computer should find Star Venture a relatively easy game to type. This space opera is created with just a few redefined characters in Graphics Mode 0. It will run on all Atari computers of any memory size, with either disk or cassette.*

"Kid, I've jockeyed rockets from one end of the galaxy to another, but I've never seen anything hairier than the Ghost Station of Antroni. . ." The Sarge's words echoed in my head as a huge metal gate clanged shut behind me!

Yes, I was now locked in the vast outer chamber of the legendary Ghost Station! Beyond my viewport floated rare and incredibly valuable Quontex crystals. All I had to do was fly over them to pick them up—while avoiding those lethal Kirollian Death Pods!

Yet I knew this was my last desperate chance to avoid spending the rest of my life toiling as a slave in the living mudslime of the Antronian glort fields. Shipwrecked in the Antroni star cluster after barely surviving a cataclysmic meteor storm, I needed to come up with plenty of cash for repairs and refueling—not to mention those outrageous Existence Taxes they charge on Antroni!

So I rubbed the sweat from my palms, gripped the control stick, and pushed gently forward. . .

## GHOST STATION

Each chamber of the gargantuan abandoned space station was slightly different. Only some of them had barriers, but every chamber contained nine near-priceless Quontex capsules as well as too many death pods.

But until I collected every capsule from one chamber, the gate to the next remained forever locked. One brush against the walls, barriers or death pods and I'd be nothing but a handful of stardust!

As I carefully explored the station, I was surviving long enough to notice a pattern: After five chambers, it seemed as if I was starting all over again—except it was harder. A lot harder! Whatever long-forgetten alien race built this Ghost Station was crazy, not to mention sadistic as all get-out.

Luckily, I still had some shield energy left. I'd started with 15 shields, but you know sometimes you just can't avoid those killer pods. So you've got to press the old fire button and. . . BLAMMO. . . there goes another pod. Well, I still have enough left for three more shields. And there's gotta be a way out of here with my crystals!

Doesn't there?

*Ronald Saari would be happy to have you log onto his New Jersey Atari BBS, the Loony Bin, at (201) 449-3895.*

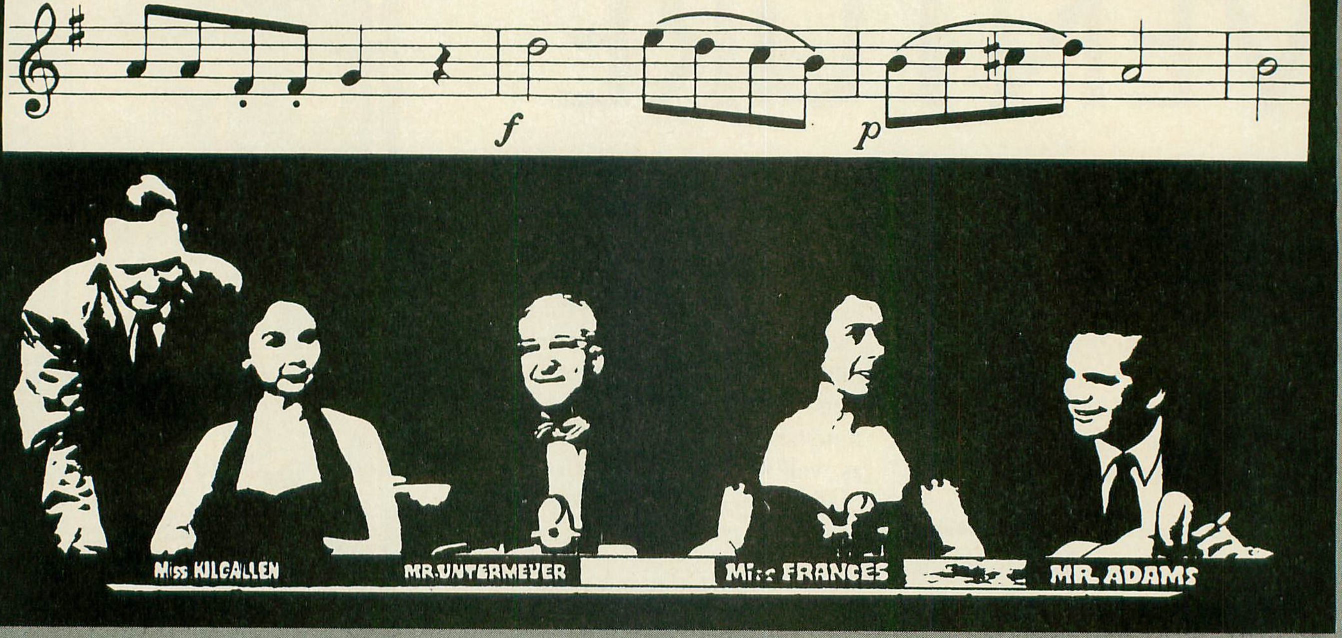
Listing on page 63.



# Guess that Song

## How many notes do *you* bid?

by KARL E. WIEGERS




*A musical quiz show emceed by your Atari. How many notes do you bid to **Guess That Song**? This BASIC program runs on all Atari computers of any memory size, with disk or cassette.*

Now, in the privacy of your own home, you can experience the thrills and suspense of being a contestant on one of the classic television quiz shows. Just type in Listing 1, check it with TYPO II, SAVE a copy and get ready to play Guess That Song against your friends!

With this program, your Atari can perform the first ten notes of 40 songs—rock, classical, TV/movie themes, and general.

After entering the names of the contestants, each opponent bids to see who thinks they can identify the song from the fewest number of notes.

The bidding starts at 10 notes and ends when someone presses [P] to pass. Players alternate bidding and each bid must be lower than the previous one.

The computer will play the number of notes bid. You can press [R] for a repeat playing of the notes (don't press [RETURN]).

## BIG CHANCE

Here's your big chance! Now is the time to guess the mystery song. When you think you have it, press [A] to see the correct answer. Then you must tell the computer if you identified the song correctly. Press [Y] if you got it right, or [N] if not. Use your judgement to determine how accurately a song's title must be stated to be considered correct.

If you won the bid and guessed the song correctly, your score will increase by 11—minus the number of notes in the bid.

For example, a song successfully identified from four notes gives that player seven points. The fewer the

notes, the more points awarded for a correct identification.

However, if the guessing player misses the song, then the score decreases by the number of notes in the bid. When prompted, press any key to go on to another song. The player who passed on the previous song gets the first chance to bid on the next one. Fifty points wins the game.

Correctly guessed songs won't reappear in the current game. A missed tune might pop up again later, though.

## ADDING SONGS

You can replace any of the tunes in "Guess That Song!" with your own selections. You must construct a DATA to replace one already in the program, using the same line number. Lines 4000–4090 are the rock songs, 4100–4190 are classical, 4200–4290 are theme songs, and general songs live from 4300–4390.

The DATA statement for each song has five factors. First is the relative tempo (speed) at which the song is played. Smaller tempo numbers play faster.

Second factor is separation of the notes in the song. Increasing this number gives a more staccato character to the tune, as well as slowing it slightly. Third comes a string of 10 funny looking characters—which will be explained later.

Fourth is a string of 10 letters, which represent the relative duration that each note is to be played. For example, if the letter A represents an eighth note, then B represents a quarter note, D is a half note, and H a whole note. Finally, the title of the song completes the DATA statement.

Write down the notes in the song and their relative durations. Check *Table 1* and look up the keystrokes corresponding to that note. The pitch values for the SOUND command are also shown. The ten-character string in the third position of each DATA statement is the sequence of keystrokes you found in the table for the first 10 notes of your song.

## TRYING NEW TUNES

To try out your new tune, replace one of the DATA statements in Guess That Song with the entries for your song. It will take some experimenting to get the song to sound right, so let's use a quick way to test the new selection. Add this line to the Guess That Song program:

```
2255 GRAPHICS 0:LN=????
: LIST LN: PRINT "GOTO
2255"
```

Replace the ???? with the line number you are using for your new song. Now type RUN, then press [SYSTEM RESET] without entering player names. Now type GOTO 2255.

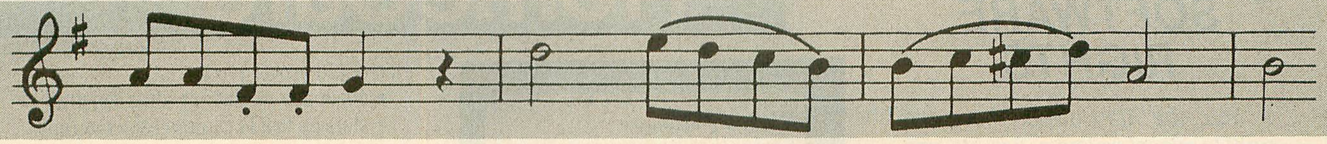
The screen will clear, your new DATA line will be listed on the screen along with a GOTO 2255 line, and you'll hear the song. Disregard the error message which appears. To change any part of your DATA statement, edit the line shown using the cursor keys, and press [RETURN] twice.

Repeat this procedure for all your new songs until they are just right. Then, type 2255 and press [RETURN] to delete line 2255, and SAVE the modified program. SAVE it with a different filename than used for the original Guess That Song so you can keep both versions.

## SAMPLE SONG

As an example, let's do "Red River Valley" in the key of F. The notes are: C F A A A A G A G F. *Table 1* tells us to type, in Inverse Video: s 6 [CTRL] P [CTRL] P [CTRL] P [CTRL] P " [CTRL] P " 6. The complete data statement might look like this:

```
4000 DATA 15,6,[illegible]
[illegible],AABAABAAAE,"Red Rive
r Valley"
```



## PROGRAM TAKE-APART

| | |
|---|---|
| 50–80 | Initializations |
| 110–150 | Call subroutines for main parts of program |
| 160–220 | Decide whether to continue, play again, or quit |
| 800–820 | Subroutine to make error sound |
| 900 | Subroutine to get a keypress |
| 1000–1150 | Subroutine to get player names |
| 1500–1540 | Subroutine to show players and scores, select next song, show category |
| 2000–2120 | Subroutine for bidding on number of notes |
| 2200–2260 | Play specified number of notes of current song |
| 2270–2310 | Let user play again or see the answer |
| 2500–2550 | Play the song |
| 2800–2840 | Let user indicate whether guess was correct |
| 2850–2890 | If correct: increase score, play all ten notes, set flag so song isn't played again this game |
| 2900–2910 | If wrong, decrease score |
| 3000–3010 | Get keypress and go on with game |
| 3100 | Subroutine to make sound when score goes up |
| 3500–3680 | Judge if there is a winner, play tune if yes |
| 4000–4090 | Data for rock songs |
| 4100–4190 | Data for classical songs |
| 4200–4290 | Data for theme songs |
| 4300–4390 | Data for general songs |
| 5000 | Data for song played when someone wins |

continued on next page

Table 1

| Pitch Values and Keystrokes for Notes. ([INV] stands for Inverse Video key). | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Note** | **Value** | **Keystroke** | **Note** | **Value** | **Keystroke** | **Note** | **Value** | **Keystroke** |
| C | 243 | [INV] s | A#/Bb | 68 | D | F#/Gb | 42 | * |
| C#/Db | 230 | [INV] f | B | 64 | @ | G | 40 | ( |
| D | 217 | [INV] Y | C | 60 | < | G#/Ab | 37 | % |
| D#/Eb | 204 | [INV] L | C#/Db | 57 | 9 | A | 35 | # |
| E | 193 | [INV] A | D | 53 | 5 | A#/Bb | 33 | ! |
| F | 182 | [INV] 6 | D#/Eb | 50 | 2 | B | 31 | [ESC] [CTRL] * |
| F#/Gb | 173 | [INV] — | E | 47 | / | C | 29 | [ESC] [CTRL] = |
| G | 162 | [INV]" | F | 45 | — | | | |
| G#/Ab | 153 | [INV] [CTRL] Y | | | | | | |
| A | 144 | [INV] [CTRL] P | | | | | | |
| A#/Bb | 136 | [INV] [CTRL] H | | | | | | |
| B | 128 | [INV] [CTRL] , | | | | | | |
| C | 121 | y | | | | | | |
| C#/Db | 114 | r | | | | | | |
| D | 108 | l | | | | | | |
| D#/Eb | 102 | f | | | | | | |
| E | 96 | [CTRL] . | | | | | | |
| F | 91 | [ | | | | | | |
| F#/Gb | 85 | U | | | | | | |
| G | 81 | Q | | | | | | |
| G#/Ab | 76 | L | | | | | | |
| A | 72 | H | | | | | | |

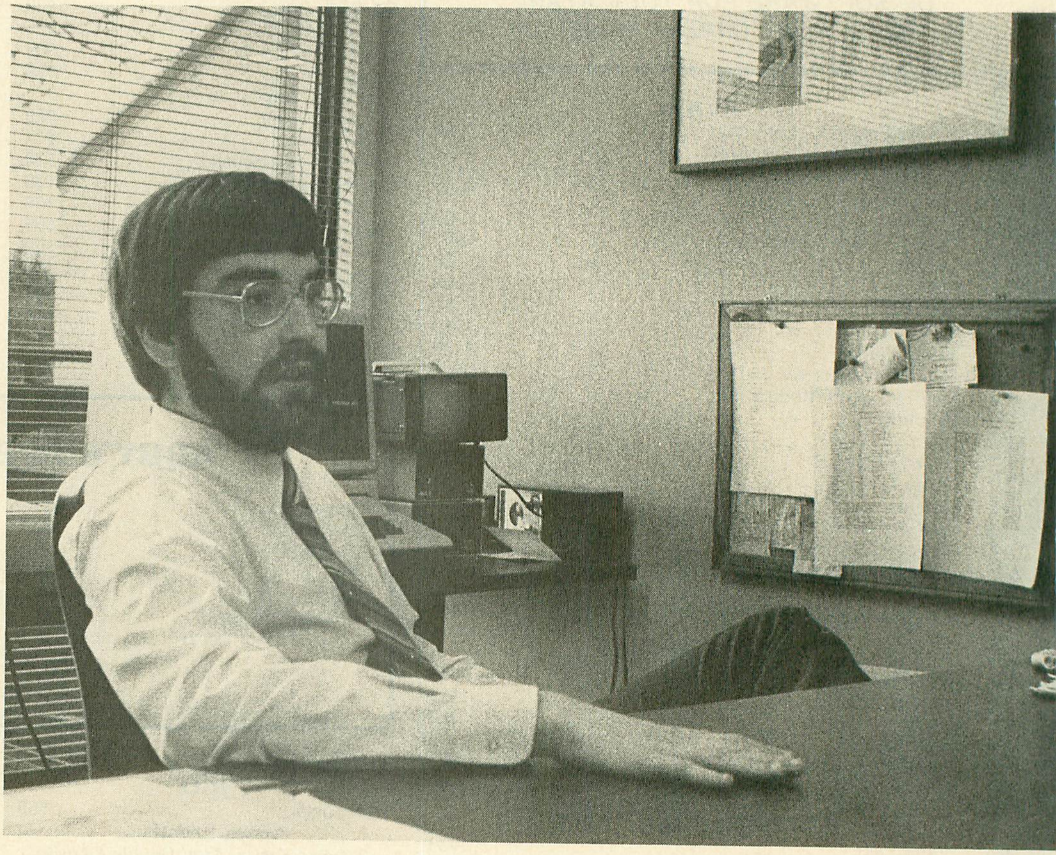
Listing on page 57.



# WAR GAMES

## the story of S.S.I.

by JACK POWELL,
**Antic** Technical Editor



*Photography Linda Tapscott*

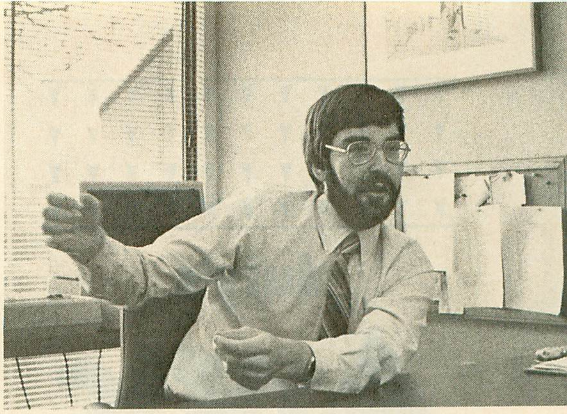
May 8, 1945, V-E Day. The war was over. Robert Billings returned from the Army to finish his education and received his Ph.D. in English, specializing in American war novels. His doctoral dissertation was about *The Naked and the Dead*.

While earning his living as an English professor, Billings pursued an interest in game design. He drilled holes in a piece of wood and drew a map of North Africa on it. He had screws and nuts and bolts that he would put in the holes, and you moved these pieces along and if you ran into another person's piece it would push through the other side and you knew you had combat.

He had this elaborate system where he used nails as infantrymen, and carved out little tanks, and used marbles with mirrors and you had to roll the marble down and knock over the opponent's nail.

He never published these games, but he played them with his son.

In 1965, Robert Billings brought home a board strategy game that was a little different, **Tactics II**, from Avalon Hill, the first commercial wargame. He showed it to his son and



> "When you play a wargame, you realize you wouldn't want to be in war."

then taught him how to play. At the age of seven, Joel Billings was hooked.

## STRATEGY ADDICT

"I was trapped for good. That was it." Joel Billings is now president of SSI, Strategic Simulations, Inc., considered by many to be the premier computer strategy game company. He looks remarkably like film director John Landis. "I played through the whole series of Avalon Hill wargames. I definitely was a heavy wargamer for a long time."

Joel's father eventually lost interest in wargames and and Joel lost an opponent. By the time he reached junior high, he discovered that wargamers were a minority. There was no one to play against. In desperation, he joined the school chess club, taught its members wargames, and started his own wargame club. "I had to create the opponents by getting them interested."

But Joel's family moved and when he started high school, he was back to square one. So he began playing by mail. At one point, he was playing nine games simultaneously in two different tournaments.

There was a company offering a service—almost like a dating service—where you paid $40 for a list of war gamers in your area. Joel paid. "Yeah, finding opponents was tough."

## ECONOMETRICS & COMPUTERS

College came along and Joel found himself with little time for wargames. He was a math-econ major and into econometrics, mathematical modeling and forecasting. He was using computers a lot and began to realize they were perfect for wargames!

Computers could handle far greater detail than board games and eliminate most of the tedious paperwork. But most importantly, the computer was an opponent! 90% of board war gamers played solitaire, moving the troops on both sides of the board. A lot of people out there were looking for someone to play with.

Billings didn't know this at the time. He didn't even know home computers existed. He only knew he wanted to do wargames on computers and "Star Trek" was the only computer strategy game around. And it was on a mainframe.

## SCHOOL OR BUSINESS?

In 1979, he was planning to go to business school, but all he really wanted to do was get into computer wargames. A friend had shown him a TRS-80, so he knew his idea could work. He tried to convince a programmer at IBM, but the man just wasn't a wargamer and didn't believe there were people out there who would buy these hard, complicated strategy games.

"SSI all started with an idea and it was touch and go for awhile as to whether I was going to go to business school or start this company."

Finally, Billings put questionnaires in local hobby shops for programmers interested in wargames. There were two responses: John Lyon and Ed Willeger. They were both programmers but, more importantly, they were *wargamers*.Around this time, a venture capitalist introduced Billings to Trip Hawkins, who is currently president of Electronic Arts. But back then, Hawkins was a marketing manager for Apple. He convinced Billings that Apple was going places. "We were very lucky that way or we could have gotten started doing TRS-80 games."

John Lyon was a wargamer into miniature figures. He had been a programmer since the '60s but had done nothing in BASIC and had never worked on a personal computer. Ed Williger was more of a wargamer than Lyon, but also had no experience in BASIC.

Lyon wrote SSI's first game, **Computer Bismarck**, and Willeger wrote the second, **Computer Ambush**. The first version of Computer Ambush for the Apple was incredibly

continued on next page

July's

# Antic

# ACTION EDITION

includes a

# DOUBLE-SIDED DISK!

Bonus second side contains

## ALL 6 WINNING ILLUSTRATIONS

from the ANTIC cover coloring contest, as seen in the June, 1985 ANTIC issue.

(To view some of the micro-screens you'll need the software from KoalaPad or Atari Touch Tablet. Fun With Art software is required for one picture.)

slow. It could take three hours to process one turn! "It was just terrible." But it was one of their first products and they needed the money.

## SILICON STRATEGISTS

Today, SSI has 60 games and sleek, modern offices in the Mountain View fringe of Silicon Valley. Serious computer wargamers consider it a company in a class by itself.

There are, perhaps, four categories of computer games: arcade, adventure, fantasy role-playing, and strategy-simulation. SSI seems to be a solid Number one in the fourth category. There may not be as many wargamers out there as arcade fans, but wargamers form a hard core of faithful consumers.

The typical elements of a wargame include statistics, a detailed combat map, statistics, charts, troop allocations, statistics, historical accuracy, and more statistics. SSI games are rated from introductory through advanced. Don't attempt an advanced SSI game if you're not a hardened combat veteran! The documentation alone will leave you gasping and bloody on the battlefield. Billings recommends **Eagles** or **Field of Fire** as excellent introductions to the genre.

## WAR PAYS!

Most SSI games are written in BASIC then compiled for speed. Almost all their games are written by outside contributors. Of the 12 games published last year, six were by regular contibutors—such as the prolific and popular Gary Grigsby—but six were by complete newcomers.

"There's a decent amount of money to be made. A war game may bring in $10–20,000 for the programmer." Interestingly, Atari people are heavily into wargames. "Computer for computer, there's a higher percentage of Atari owners that play wargames than there are Apple or Commadore owners."

SSI has developed in-house graphics tools—Graph-Pak and Square-Pak—which speed map design and handle special algorithms, such as "line-of-sight checks", which programmers find tedious. Utilities such as these simplify transfer between computers and "allow us to crank these games out."

Billings referred to some of their games as "clone games." By keeping the core system and changing the weapons and the map, a new game is created. Gary Grigsby is their most prolific author partly because he's mastered their utility tools and the concept of clone games. "New math, new database, and you've got a whole new game."

## WHO PLAYS?

Some may think wargamers are warmongers—right-wing hawks with a love of weapons and power. Billings says surveys show most wargamers are well educated and have a relatively high income. Not surprisingly, 99% of wargamers are male. Using one of his own games, **President Elect**, Billings rated himself, on a scale of 0-Conservative to 100-Liberal, as 60 overall. He was 83 on social views and 50 in foreign affairs. "When you play a wargame, you realize you wouldn't want to be in war."

But the fascination is there. We asked what turned him on: "Charts. Charts with weapons. A list of all your weapons, each tank—about 50 different tanks, and anti-tank guns, the range and the speed of the gun, and the maximum penetration."

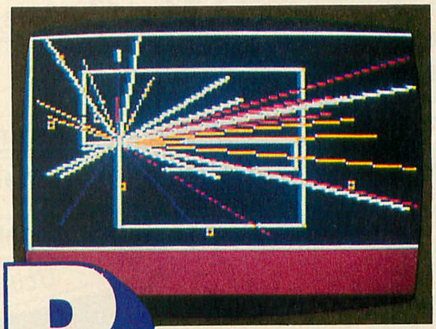
Billings is particularly excited about a new SSI game called **Colonial Conquest**. It's a six-player game, where you play one of the major world powers during the period of your choice: 1880 or 1914. The powers are U.S., Japan, Russia, Germany, France, and England. You're out to control the world. Total global dominion. "It's fun to go out there and conquer the world on the screen."

## RECOMMENDED READING

***Sorcerers & Soldiers****: Computer Wargames, Fantasies and Adventures,* by Brian Murphy. $9.95. 226 pages, paperbound. Creative Computing Press, 39 East Hanover Avenue, Morris Plains, NJ 07950. 1984.

bonus game

# DARK STAR



by MICHAEL MITCHELL

*Fly the Darkstar and wipe out enemy alien bases. There are two versions of this game, one is written in BASIC and the other is in ACTION!. Both will run on any Atari of all memory sizes, with either disk or cassette. But the ACTION! listing requires the ACTION! cartridge from Optimized Software Systems. Antic Disk subscribers will find a run-time file of the ACTION! version on their disk. Go to DOS and load DARKSTAR.EXE with the L function.*

The year is 2001, you just graduated from high school and you're bored. All your friends headed for college or fulltime jobs, they seemed to have things planned out pretty well. You had dreams of medical school, but there was just no money for that kind of thing. So, what do you do?

You join the U.S.A.F.

## IN LUCK

Things could be worse. It turns out you have a remarkable aptitude as a fighter pilot. But just as you soar to the top of your class, aliens from the planet Spectra land on Earth and begin installing military bases all over the planet.

Because of your stupendous flying abilities, you are selected to pilot the Air Force's new secret weapon: Darkstar. Your mission is to destroy as many enemy bases as possible.

## FLIGHT INSTRUCTIONS

The controller on Darkstar is surprisingly primitive for a new secret weapon, and very similar to an antique Atari joystick. Just move the crude device in the direction you wish to fly the plane. The object is to pass your jet over as many of the enemy bases as possible, spraying them with your wake of radioactive wastes.

You're doing fine until you encounter one major problem: the controls have jammed. As a result, Darkstar continues to spray wastes nonstop, thus preventing you from crossing your own path. If you do touch the glowing contrail, your jet will be instantly damaged. Darkstar can withstand three blasts of radioactive waste. Upon the third blast, Darkstar will be terminated—as will you, the pilot!

## NOT ENOUGH

As if you didn't have enough problems, some wimpy, kneejerk ecology group is up in arms just because your radioactive trail has permanently rendered uninhabitable a large number of small farms plus the entire state of Missouri.

Reacting to the pressure, the President interrupts his vacation and orders NASA to erect a deadly force field around your area of operation, effectively converting your flight into a kamikaze mission.

## MERIT SYSTEM

But you're in this for the glory, and you will receive 30 merit points for each alien base destroyed.

However, you can keep obtaining new Darkstars at the end of each mission, simply by pressing the joystick button. If you somehow keep flying until all the aliens flee back to Spectra, maybe the scientists will figure out a way you can escape through the force field . . .

## TYPING IT IN

Listing 1 is the ACTION! version of Darkstar and Listing 2 is the BASIC version. Although both games are similar in structure, they are not identical. The BASIC version has a simpler title screen, a different explosion routine and—more importantly—is much slower so your scores will probably be higher.

continued on next page

If you have the ACTION! cartridge, type in Listing 1, SAVE it and then compile and RUN it. Those with BASIC should type in Listing 2 and check it with TYPO II. SAVE a copy before RUNning it.

### ACTION! ANALYSIS

The source code is pretty well remarked and consists of only five procedures:

1. PROC WAIT( ) Pauses according to the CARDinal value passed within the parameter.

2. PROC TITLE( ) Prints the title, then rotates the screen colors.

3. PROC BOX( ) Randomly draws enemy bases.

4. PROC MAIN( ) The heart of the program. It sets graphics to mode seven, checks for collision, checks the joystick, and moves the player.

5. PROC START( ) Since MAIN( ) is called within itself, START( ) is used to isolate the initial TITLE( ) call.

*Michael Mitchell is a San Francisco high school student who wrote the upcoming Antic Public Domain release **Rainbow DOS** and is sysop of Twilight Zone BBS at (415) 755-0375.*

Listing on page 60

# SLIDE

## The 24-puzzle: can YOU program a solution?

Program by MARK MOORE
Article by MICHAEL CIRAOLO, **Antic** Associate Editor

*A computerized version of the 24-tile puzzle grid, Slide is easy to type in and a good starter for advanced programmers who want to try their hands at intelligent game design. Written in BASIC, Slide requires a joystick and 16K RAM on any Atari, disk or cassette.*

Tile puzzles—grids of 8 tiles in a 3 x 3 arrangement or 24 tiles in a 5 x 5 arrangement—have been around a long time. Can you solve the 24 Puzzle? Can your Atari solve it? For an introduction to the design of intelligent games, read on. You'll find a jumping-off point for further programming and research. (Also be sure to read the article about Computer Chess in this issue.)

If you only want to play the game, type in Listing 1, check it with TYPO II, and SAVE a copy. Use the joystick to move the cursor in the desired direction. Move the lettered tiles by pressing the joystick button. You can move a tile into any vacant square.

When you get the tiles in alphabetic order, press the [SPACE] bar. The computer will verify your result—the time it took to complete the puzzle, or an obnoxious razz signifying that you need to try again.

### INTELLIGENT GAMES

There are two types of "intelligence" you could use to set your Atari solving the 24 Puzzle. You could use an algorithm, which is a logical set of steps for solving a specific problem (or showing if no solution is possible). Since the program would have to examine every possible move until the best solution was discovered, this would be very slow and possibly beyond the limits of a computer's memory.

The alternative is devising a heuristic problem solving technique. This means developing a set of rules that cut out a lot of the false moves. Most electronic games favor heuristics since they require less moves, which makes them faster and more memory-efficient than algorithms.

If you are going to write a program to solve the 24 Puzzle, you might wish to use a common heuristic device called a "tree."

The game's starting position is called the "root." Spreading up from the root are all the legal moves, produced by a subroutine called a legal move generator. Each legal move, in turn, begets another generation of possible moves. It is up to the computer to evaluate each end position to see if that position is near a solution.

Intelligent game programs use a device called an evaluation function to supply a numerical score for each end position. Such a function for the 24 Puzzle might count the number of vertical and horizontal tiles between the current position and the target position. For instance, the "A" tile might be three spaces away from the upper left corner. Add this to the "B" tile's distance of five from its target position. Add this sum to the position for the "C" tile, and so on.

The score resulting from the evaluation function tells the computer which branches are closer to a solution; the program can then disregard the least promising result with a process called "pruning."

### SOLUTION STRATEGY

Now we have a strategy:

**1.** The program will generate all possible moves from the root.

**2.** It will then evaluate each position to see how close a position is to the target.

**3.** Next, it will draw a new tree, based on the most promising results of the previous tree.

Each time the program draws a new tree, or picks the best possible position from a choice of branches, it is determining its next move.

In the world of electronic gaming,

continued on page 50



Linda Tapscott

*"You don't seem to be playing your usual game today, Dave."*
*—HAL 9000, from 2001*

# Computer CHESS Programming

by MICHAEL CIRAOLO, **Antic** Associate Editor

Computers that play chess have fascinated both the public and programmers ever since a large IBM 704 played two legal but bumbling games at a 1957 Dartmouth Conference on Artificial Intelligence. (For more about designing intelligent games, see "Slide" in this issue.)

In this article, we examine the current state of computer chess programming—as represented by the **Odesta Chess** software for Atari (Odesta Corp., $69.95) and the **Turbostar 432**, an expert-level dedicated chess computer (SciSys, $350) which uses the same 6502 microchip as the Atari.

During our research, we discovered that Atari computers play a more than passable game of chess. We matched the Odesta program against the Turbostar at levels ranging from easiest to hardest. The more expensive Turbostar consistently won, but the Odesta gave it a tough battle each time. And both play chess well beyond the skill of most non-competition human players.

## PLAYING GAMES

The basic approach to designing intelligent computer games is not hard to understand, although the programming itself isn't easy. So says Larry

continued on next page

Atkin, who programmed Odesta Chess and helped write the groundbreaking CHESS program at Northwestern University. Successive versions of CHESS held the Computer Chess Championship throughout the 1970s.

Atkin said that most chess programs represent variations of a "tree" search pattern.

The computer "sees" the board as an 8 x 8 array of numbers, with the pieces represented as a positive or negative number.

Move selection involves three modules—a move generator, an evaluation function and a quiescence function.

The first module produces a look-ahead tree of possible moves starting from a given position and lists all situations that could possibly "branch" from a move.

## CHESS MODULES

The program then develops a second generation of possible branches, and so on. Obviously, with millions of possible chessboard situations, even a Cray XMP supercomputer would run out of processing space quickly. That's why game design requires additional modules.

The second module is called the evaluation function. It is here that knowledge of chess strategy and concepts is put into an algorithm—a series of steps by which a computer can solve a given problem.

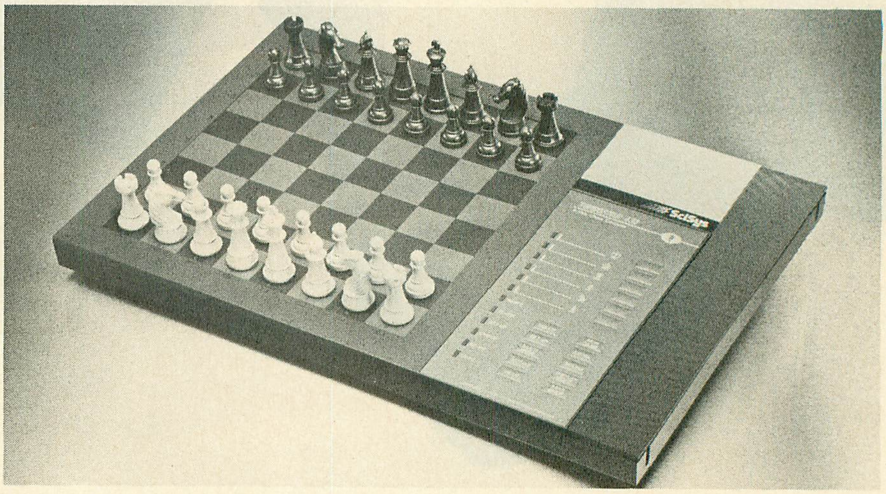
An evaluation function program might compare the two opponents' material forces, mobility, pawn strength, king safety, control of central squares, and so on. This function looks at each "node" (possibility) on the tree to analyse specific board positions.

The more chess sophistication you put into the evaluation function, the more processing time the program takes. So there is a trade-off between the number of nodes that can be examined and the complexity of the evaluation module.

Because most of the nodes on a tree aren't optimum positions, the program also needs a section to evaluate the end position of the various branches and determine what branches are worth pursuing. This module is the quiescence function—it "prunes branches" (eliminates possible moves) that aren't promising, thus freeing computer memory.

This complex process results in the computer making a move, and then developing a strategy for the situation created by the move.

Most dedicated machines currently use the same chip as the Atari, the 6502 microprocessor. Software is compiled into assembly language from C or Pascal. "C keeps you closer to assembly language, Pascal protects you from too many of assembly language's tricks," said Julio Kaplan, president of Heuristic Software in Berkeley, California. Kaplan programmed the Turbostar for SciSys.



## NEW APPROACH

Although "brute force" is the proven approach to programming chess and other games, the philosophy is changing, according to Kaplan. He favors a "selective search" instead.

"You rely on special knowledge for evaluating each node," Kaplan said. That is, the computer starts playing more like a grandmaster and less like a computer. The search is narrower, but the "thinking" about various positions is more intensive.

Kaplan brings considerable "special knowledge" to chess programming—the last time he checked, he was ranked "about 73rd in the world." He was World Junior Chess Champion as well as a National Master. Active as a professional chess player for five years, Kaplan also holds a master's degree from U.C. Berkeley in computer science.

## MOVING UP

Chess computer advances are coming quickly in both hardware and software, believes Kaplan.

There was a quantum leap between the previous SciSys Superstar machine and the current Turbostar, Kaplan contends. The Turbostar is much faster.

Kaplan said there's been considerable improvement in designing efficient search trees, with improved pruning. "It's a leaner program," Kaplan said.

Kaplan has improved the end game, an area traditionally weak in machine play because the consequences of any move went beyond the ability of the search tree, and those consequences are greater in the end game than in the opening.

To improve a chess program, you evaluate the game the program is playing. Kaplan thinks about what pieces of knowledge are missing for the computer's evaluation of a certain situation node.

That information then must be expressed in an algorithm. But that algorithm can't just be added onto the program. Kaplan must understand how all the elements of the program affect each other.

Finally, he must analyse the impact of the added algorithm on the speed

of the program, which is frequently measured in nodes per second—how many situations can the program evaluate in one second.

### THE FUTURE

With the dropping price of ROM (Read Only Memory) chips which store the game program, larger programs for the high-end machines will be available at lower prices, Kaplan predicted. In the $60–80 range, machines are much smarter than they were three years ago.

The software area is especially improvable, Kaplan believes. Of the four leading companies, two are using brute force exhaustive search—ideal for finding tactical mates in, say, four moves.

The other companies, including SciSys, are using selective searches, which play some positions very well, but still make embarassing moves on others.

"I think there will be a master-level microcomputer based chess program within two years," Kaplan predicted.

"I'd like to see these machines provide entertainment, user interest and education." Ideally, the machine should tell you more about its own thought process and coach you on your game. Playing a computer chess program will be like playing HAL in *2001*—it can tell you when your game is off. . . and why.

"A brute force machine can't explain its thought process. Only a selective search can. This makes it more interesting as a chess player," Kaplan said.

The better micro programs currently beat the mediocre mainframe programs, Kaplan said. The day is not far when there will be "upsets" between micros and mainframes—by the end of 1986.

The next generation of Turbostar, which should be available by the end of this year, will have a tactical knowledge that surpasses the ability the brute force programs are likely to have by year's end. And new machines will be upgradeable with plug-in chips!

### RECOMMENDED READING

**Computer Gamesmanship,** by David Levy. $12.95. 272 pages, paperbound. 1983. Simon and Schuster.

**Chess Skill in Man and Machine,** by Peter Frey. $18.95. 335 pages, 1984. Springer Verlag.

**How to Get the Most from Your Chess Computer,** by Julio Kaplan. $9.95. 1983. RHM.

### MANUFACTURERS

ODESTA CHESS SOFTWARE
Odesta Corporation
930 Pitner
Evanston, IL 60202
(312) 498-5615
48K disk
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# Turbo charge your Atari with an Indus GT.™

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And, included as standard equipment, each comes with the exclusive GT DrivingSystem™ of software programs. World-class word processing is a breeze with the GT Estate WordProcessor.™ And your dealer will describe the two additional programs that allow GT owners to accelerate their computer driving skills.

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The GT's small, sleek, condensed size makes it easy to park.

So see and test drive the incredible new Indus GT at your nearest computer dealer soon.

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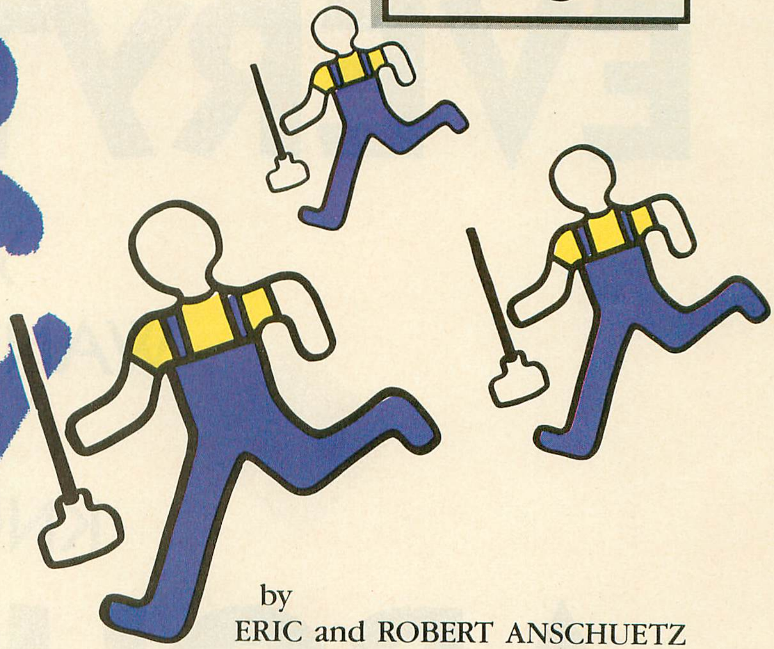
**The all-new Indus GT Disk Drive.**

*The most advanced, most handsome disk drive in the world.*



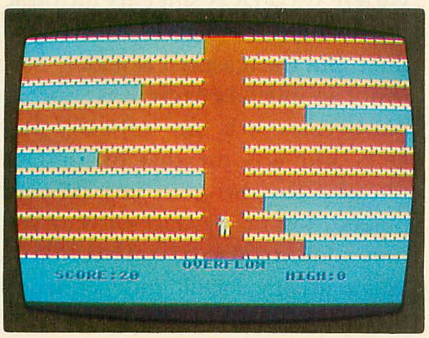

For additional information, call 818/882-9600.

# OVERFLOW



## Only your plumber's helper can save you!

by
ERIC and ROBERT ANSCHUETZ
and JOHN WEISGERBER




*Discover the thrills and excitement of being a Sanitary Engineer (plumber) as you enter a maze of killer pipes. This BASIC program works on all Atari computers of any memory size, with disk or cassette. Just type in Listing 1, check it with TYPO II and SAVE a copy before you RUN.*

Dear Miss Goodmanners:

Is there a correct way to stem a rising tide of bathroom back-ups while entertaining distinguished guests in my 49-room mansion?

Concerned

Dear Concerned:

Miss Goodmanners prefers the term water closet . . . Sadly, overflow problems are part of our modern age and must be dealt with firmly and quickly. Miss Goodmanners would never commit the faux pas of embarassing guests during a sumptuous banquet by confronting them with a mass of raw sewage.

Miss Goodmanners would award you credit for decisively hurling your plumber's helper at each of the overflowing water closets, while tactfully running between pipelines without scaring the guests. Of course, sewage problems tend to get worse as a party wears on—especially if guests discover that the duck pate has disagreed with them.

With apologies to our favorite etiquette columnist, this program uses players for the plumber, plunger and central pipe. All vertical motion is produced using a string printed at the correct place in memory. The main graphics mode is ANTIC 5.

An unusual technique here is the use of basically the same memory address for every line of the playfield graphics. Each line has its own LMS and the high byte on every one is set to the same page. The water is moved back and forth by incrementing the low byte on each LMS. The increment for each line is held in a one-dimensional array. If a column of sewage is hit by the plunger, the increment's sign is simply reversed.



*Members of the noted **Antic** game programming team of Anschuetz, Anschuetz, and Weisgerber tell us that they are currently attending Eastern Michigan University and would like jobs as programmers when they graduate.*

Listing on page 62

# EVERYTHING YOU WANTED TO KNOW ABOUT EVERY D.O.S.

## *Including the brand-new DOS 2.5*

by ERIC CLAUSEN

Why in the world are there so many versions of DOS (Disk Operating Systems)? Flip through your favorite Atari magazine (**Antic**, of course) and you see ads and reviews for products with names that end in DOS. Who uses them, and why? The following will answer key questions and point out some of the good and not-so-good points of the major Disk Operating Systems available for the Atari computer.

For those of you who are new to the Atari, DOS 2.0S has been the most widely used DOS since its introduction in 1980. It is a good, reliable product. But the reason it is widely used is not so much because it is superior but because it is the "official" Atari DOS and was the first major DOS released for the Atari line of computers. Most major Atari software vendors conformed to it, so it became the "standard" by default, independent of merit.

If you wish an introduction to Atari DOS 2.0 and some of its functions, please refer to "Why You Want DOS 2" (**Antic**, April 1985). For those experienced in DOS 2.0, and yearning to explore greener pastures, read on.

### ATARI DOS 2.5

This long awaited product, successor to Atari 2.0, will become the new 'official' Atari DOS. It was written by the same group of people (headed by Bill Wilkinson of Optimized Systems Software) who are responsible for Atari BASIC, DOS 2.0, BASIC A+, BASIC XL, DOS XL, ACTION! and other top-ranked Atari products.

DOS 2.5 supports both single density and the enhanced (dual) density mode on the Atari 1050 disk drive. If you format a disk in your 1050 drive with this DOS, you'll find that you now have 1010 sectors (129K) of available disk storage. This represents

a 43% increase in capacity over DOS 2.0. DOS 2.5 maintains the use of 128 byte sectors but increases the number of sectors per track from 18 to 26.

Most importantly, DOS 2.5 maintains file compatibility with DOS 2.0. Thus if you have a 1050 drive, you can boot up DOS 2.5, format a disk, directly copy your DOS 2.0 files onto the disk and have considerably more room left over. All this with no hardware modifications to the disk drive.

Otherwise, this new DOS looks and acts exactly like DOS 2.0. The menu will be reassuringly familiar as there has been only one addition: Option [P] on the DOS 2.5 menu will allow 1050 disk drive users to force a single density disk format instead of the default enhanced density.

Those of you with 810 drives need not despair, this DOS is for you too. Although you will not be able to use the enhanced density feature, you can boot DOS 2.5 disks that were formatted and written in single density on 1050 drives. The way that DOS 2.5 handles this is to "hide" files from the 810 drive that cross over sector 720, which is normally the last DOS 2.0 sector. If you completely fill a DOS 2.5 disk (1010 sectors) on a 1050 and then check the disk directory at some point you will see files listed like this:

```
FILE1.BAS     025
<FILE2.BAS>   025
```

This tells you FILE1.BAS is entirely contained within the first 720 disk sectors and can therefore be accessed by an 810 drive. The file(s) with the "< >" characters around them are NOT accessible with an 810 drive because they are physically located where the 810 drive can't read them. So if you have an 810 and ask your friend with a 1050 to copy some of his files, make sure the files you want don't have < > around them!

Other features of DOS 2.5 are:

1. Though the directory of an empty formatted disk will read "999+ FREE SECTORS". You really have 1010 sectors.

2. Option J (Duplicate Disk) now formats the destination disk before copying.

3. DOS 2.5 will allow 64K of memory in the new 128K Atari 130XE computer to be used as a ramdisk.

4. A file conversion utility to convert Atari DOS 3.0 files to the DOS 2.5 format.

5. A utility to create autoboot basic programs.

6. An un-erase capability to retrieve accidently erased files.

7. You can easily turn write verify on or off and change the number of disk buffers, without resorting to POKEs.

8. The ability to test for bad sectors—whole disk only.

Options 3 through 8 are not directly accessed through the menu but are included on the DOS 2.5 disk as binary load files.

One thing that concerns me, as a user, is the lack of a disk utility program for enhanced density disks. In some preliminary checks, I've found that DiskWiz 2 will read all enhanced density sectors out to sector 1023 (the difference between 1023 and 1010 is taken up by the boot and directory sectors where program data is not stored). It won't trace or map sectors that run past sector 720, however.

I hope some company or individual will soon produce a full-featured disk utility compatible with this highly impressive new DOS 2.5.

## ATARI DOS 3.0

DOS 3.0 is the DOS Atari has been shipping with the 1050 disk drive. It supports enhanced density but, unfortunately, will not read DOS 2.0 files directly and vice versa. DOS 3.0 permits conversion from DOS 2.0 files to DOS 3.0 format, but disastrously no provision was made to go the other direction.

Once you converted your DOS 2.0 files to DOS 3.0, you'd never be able to share your programs with an 810 drive owner. **Antic** published a method to convert back to DOS 2 (January 1985) and there are some public domain utilities around. Check your local users group, Compuserve SIG*Atari, or wait for DOS 2.5.

The DOS 3.0 file management is a more serious flaw. It stores files in "blocks" of 1024 bytes as opposed to the DOS 2 (and compatibles') 128 byte "sectors." This can be wastefully inefficient. If you save a file of 1025 bytes (one block plus one byte), DOS 3 will save it as 2 blocks, wasting 1023 bytes of disk space!

This product should be avoided. It's a shame so many newer Atari users have been saddled with it.

## DOS XL 2.3

DOS XL is a superb product, written and marketed by Optimized Systems Software (OSS). Though no one DOS is ideal for the needs of all users, this product comes close.

DOS XL is shipped with both single and double density versions on the disk. It directly supports both single and TRUE double density.

**DOS XL includes some features which make it truly unique**

True double density utilizes 256 byte sectors as opposed to the 128 byte sectors of single density, with the number of sectors and tracks remaining the same. Therefore, the storage capacity of a double density disk is 256*18*40 bytes or 184,320 bytes, which exceeds the capacity of the enhanced density mode of the 1050 drive by more than 50,000 bytes—a substantial difference by anyone's standards.

Of course, you must have a disk drive capable of double density to take advantage of this increase, and to date no Atari-manufactured drive has had true double density capability. Owners of other drives such as Rana, Indus, Trak, Percom and Astra already enjoy the benefits of this extra storage.

Atari 1050 owners will find available at least two hardware upgrades to true double density. They are manufactured by Happy Computers, Inc. of Morgan Hill, Ca. and by ICD, Inc. of Rockford, Ill. These modifications take advantage of special DOS's which we'll look at in a bit.

continued on next page

DOS XL includes some features which make it truly unique. Three versions of DOS XL are included on the master disk. Each supports different memory configurations possible on Atari computers in order to maximize free memory for programming purposes.

As shipped, DOS XL is configured for use on any Atari with Atari or OSS BASIC. Another version of DOS XL on the disk is intended for use in conjunction with the bank selected OSS SuperCartridges (BASIC XL, ACTION! and Mac/65). This allows the DOS to occupy the RAM "under" the SuperCartridge, effectively increasing the amount of free RAM by 4608 bytes in a 48K Atari 800. Owners of 800XLs can utilize yet another version of DOS XL which takes advantage of the extra RAM available on the XL machines under the OS.

DOS XL can be either menu driven, like Atari DOS 2, or command driven like Apple DOS, CP/M and UNIX. People with a wide variety of computing backgrounds can therefore feel comfortable almost immediately with this product.

A menu driven system provides prompts and doesn't require that the user memorize numerous DOS commands. A command driven system is far faster once the user has mastered the commands. Also, the command mode occupies about 2K less memory since a menu doesn't have to be loaded into memory.

DOS XL supports numerous "intrinsic" and "extrinsic" commands. Intrinsic commands are those which can be issued in the command mode and do not require disk access (they reside in memory). Examples include: disk directory, change default drive number, protect and unprotect files, process batch file, run cartridge, erase file, etc.

Extrinsic commands are commands whose code resides on the disk, not in RAM. Examples include: copy, initialize disk, menu, etc. Actually, *any* binary load file, with the .COM (command) extender, can be a DOS XL extrinsic command.

Many long-time users of Atari DOS find the use of extrinsic commands irritating because they are not used to the requirement of having the various extrinsic command files present on the disk along with the DOS itself. A simple solution is to make a copy of DOS XL including only the files for extrinsic commands used most often.

Another complaint expressed is that all these extra files eat up too much disk space. There are three ways around this problem: Include *only* the files you need on your working DOS disk, use 2 disk drives (This allows you to get by with no DOS files on your disk, assuming you have a master disk in one of the drives), or get a true double density drive and increase your available space.

DOS XL also supports "batch processing". This allows you to put together a special text file made up of valid DOS commands and file names, then have those commands run in sequence by giving only one command.

**Documentation for DOS XL is extensive**

Batch files differ from extrinsic commands in that they contain only text and have their own special extender, .EXC (execute). Extrinsic commands and other files called by the batch file must be present on the disk for proper execution. In a special case, much like the familiar AUTORUN.SYS file, a batch file with the name "STARTUP.EXC" will execute when the disk is booted. This allows the user to autorun BASIC programs, something not easily done with Atari DOS 2.0.

OSS also has available special versions of DOS XL which directly support the Axlon Ramdisk, the Mosaic 64 board, and the Bit-3 80 column board. This makes it possible to program BASIC XL, ACTION!, and-MAC/65 in an 80 column format.

The Axlon Ramdisk version of DOS XL automatically recognizes the Ramdisk, formats it (with 883 free sectors) and defines it as drive 4. This is the easiest, most efficient utilization of the Ramdisk I have seen. Most DOS's require special additional hardware to utilize a Ramdisk, such as the Omnimon or the Integrator Board. I'm surprised Axlon and Mosaic haven't licensed DOS XL from OSS and distributed it with their hardware.

Documentation for DOS XL is extensive and well written, and customer support is excellent. Additionally, OSS has begun including BUG/65, an assembly language debugger, with DOS XL.

DOS XL is a well thought out, highly professional product worthy of your attention.

## SMARTDOS 8.1D

SmartDos by Astra Systems is the DOS that Astra has been packaging for some time with its own drives. Even though it is packaged with Astra drives, it is compatible with all Atari drives and all Atari DOS 2 compatible DOS's.

This is menu driven DOS with some notable differences from Atari DOS 2. It supports single and double density and displays a "status" line above the menu indicating which drives are active, their density and the size of free memory.

SmartDos has some useful menu additions that allow sector copying, drive speed checking, bad sector testing, write verify on/off, and drive reconfiguration (single to double density and vice versa). You're given the option of having DUP.SYS (the Disk Utility Package) resident in memory, though this uses considerable memory.

If you've ever needed a double density sector copier, now you've got one. SmartDos will copy 121 double density sectors per pass on a 48K machine, so several swaps are necessary to copy an entire disk (with one drive).

Like Atari DOS 2, there are no extrinsic commands to keep in mind. SmartDos does not require any special hardware and does not directly support any. It seems to have difficulty working with an Axlon Ramdisk, even with Omnimon installed. But this will be a minor concern to most users.

In general, this is an easy to use product, with more than just the basics.

## SPARTADOS 1.1

SpartaDos is more of a specialty product than those previously men-

tioned. It is specifically designed to be used in conjunction with a hardware modification for the 1050 drive called the ICD Doubler. This modification is one of two which will convert the 1050 to true double density.

In addition to supporting double density, SpartaDos, with the ICD Doubler, supports ultra-fast disk I/O. Incidentally, Happy 1050's also support SpartaDos's ultra fast disk I/O. Not surprisingly, SpartaDos and the ICD Doubler are marketed by the same company, ICD, Inc. of Rockford Ill.

The other "specialty" use for this product lies in its ability to operate with various drive formats simultaneously. This should be of interest to ATR8000 owners who are running mixed 5 1/4" and 8" drives, single or double sided, single or double density.

SpartaDos is a command driven DOS featuring intrinsic and extrinsic commands and batch processing. It also features time and date stamping of disk files and multiple subdirectories with 128 file names per directory (double the usual number). There is an 'unerase' command, which allows you to recover a previously deleted file—if you haven't writen to the disk since deleting that file.

All of these features sound great, and they are—if you have the hardware. If you don't have a modified 1050 drive or an ATR8000, you may find few actual advantages to this product.

SpartaDos is not directly compatible with disk files created with any other DOS for the Atari. However, a file copy utility is included which will convert from DOS 2 type files to SpartaDos and back again. This utility will also copy between densities with ease. The only DOS with which this utility currently will not work is Atari DOS 3. SpartaDos is an intelligent copy utility which does not have to told in advance what file type or density it is copying to or from.

There are four versions of SpartaDos included on the master disk, two standard DOS's, one for normal drives and one for hardware modified drives, and two "read only" versions for normal or modified drives.

The idea of a read only DOS is a bit unusual, as most of us sooner or later actually need to save something onto disk and "read only" means just that, it will read files but not write them. The option is provided because it takes up less memory, loads faster, and is ideal for loading games where writing to disk is not important. The standard version supports all of the SpartaDos features.

The high speed versions of SpartaDos, when used with the appropriate hardware, provide extremely fast disk I/O. An improvement in reading and writing speed of 2 to 4 times over Atari DOS 2. SpartaDos is comparable to Happy Enhancement WarpDos in speed. This increase in disk I/O is made possible by the additional disk hardware which, among other things, increases the data transfer rate on the serial bus between the drive and the computer from 19.2k bps to over 40k bps.

**All of these features sound great, and they are—if you have the hardware**

Tremendous flexibility is provided for ATR8000 owners who may be using different types of generic disk drives. Special drive formatting is provided under SpartaDos with choices of 35, 40, 77 and 80 tracks, single or double sided, and single or double density. Additionally, a special RS232 handler is provided for use specifically with the ATR8000.

Multiple subdirectory capability is another unusual feature of this product. If, for example, you have a large number of game files which need some organization, you would do the following: When SpartaDos asks you for the "volume" enter GAMES. Create two subdirectories, call one BASIC GAMES and the other BINARY GAMES. Under each of these two subdirectories, create two more subdirectories called ARCADE and EDUCATIONAL.

You now have a single disk on which you can store, under the appropriate catagories, basic arcade games, basic educational games, binary load arcade games and binary load educational games. All the directories are linked and each directory can contain up to 128 subdirectories or file names, and so on.

This is only useful to people who have large capacity drives since all the programs that fit under the subdirectories that you create eat up disk space rapidly. Ideally, a large capacity hard disk would be what you want to take advantage of this capability—if one were available.

SpartaDos is not without its problems. Error handling could be improved. If you call a non-existent cartridge you get a system crash. If you attempt to format a write protected disk, the drive keeps spinning until you turn it off. And you won't get an error message if you tell SpartaDos to format your 1050 like an 8" drive.

Many of my binary files would not run under any of the four versions of SpartaDos. This did not seem to be due to errors in the file conversion utility, as I was able to reconvert the files to DOS 2 and run them. I did not have any trouble running basic programs under SpartaDos. There must be some memory conflicts with this DOS and some machine language programs.

Another small complaint: The disk directory lists the individual file lengths in bytes, and free disk space in sectors. So keep your calculator handy.

SpartaDos cannot be used with the Axlon Ramdisk. This DOS attempts to find something in the drive hardware which is not present in the Ramdisk and gives an error message.

You really have to commit yourself to this DOS because you must go through lengthy file conversions to use it. If you're at all like me, with hundreds of disks in DOS 2 compatible format lying around, you will probably find the time required to convert over to this DOS prohibitive.

SpartaDos is a very fine product, but its appeal is limited to a relatively small number of Atari owners with

continued on next page

very specialized requirements. Consider this product carefully before you buy.

## MYDOS 3.08A

MYDOS, by Wordmark Systems, is the DOS shipped with the ATR8000. It is a menu driven DOS which supports all documented Atari DOS 2 functions and is compatible with all Atari drives and DOS 2 type files. The menu is nearly identical to DOS 2 with a couple of additions: There is a status line above the menu informing the user of online drives and their densities and default drive number, and two different options, O and P.

MYDOS option O is used to specify drive type, number of buffers, and write verify on/off. If you have a configurable drive, you can specify formatting for 5 1/4" and 8" drives with options similar to SpartaDos. MYDOS allows 35, 40, 77 and 80 track formats for single or double sided drives in single or double density.

MYDOS option P allows the user to change drive density and specify the default drive (it need not be drive 1).

MYDOS preserves the best features of both Atari DOS 2 and SpartaDos. No special hardware is required but special drive types are supported. MYDOS files are directly compatible with single density DOS 2 files. MYDOS does not seem to have the same memory conflicts with machine language programs that SpartaDos has.

This is definitely one of the easiest to learn and one of the most potentially useful DOS's available for the Atari.

## TOPDOS 1.4

TOPDOS is one of the most friendly, full-featured and useful DOS's for the Atari. In fact, it's hard to imagine that any one person could think of all the commands and utilities provided by this product. In spite of its apparent complexity, TOPDOS remains easy to use. The newcomer can take to it like DOS 2, while the more experienced can really customize TOPDOS to fit just about any conceivable system configuration and purpose.

TOPDOS is menu driven with command options identical to Atari DOS 2, except they provide considerably more flexibility. The disk directory command A, for example, includes such options as: number of columns to display directory (up to 2 on screen and 6 on a printer), alphabetize disk directory, compress file directory (to overwrite deleted files and minimize search time), list deleted files (which haven't been overwritten) and list current and deleted files (which can also be un-deleted).

**Many people will convert to this product as they are exposed to its many features.**

Some of the other standard commands which are considerably enhanced over DOS 2 are:

**1.** Copy, with the following options: append, query/no query, merge and update.

**2.** Delete, with query/no query.

**3.** Initialize disk in TOPDOS format, Atari format, and nonstandard drive format. TOPDOS format differs from Atari format in that the files do not include file numbers within the individual file sectors. This special format is required to take advantage of a few special features of TOPDOS such as alphabetization and compression of the disk directory, and to handle double sided double density drives. Atari DOS cannot read the TOPDOS format but TOPDOS can read and write Atari DOS formatted disks.

The nonstandard format option allows those users with compatible drives to specify the number of sectors desired, up to 944 per side in single density and up to 1968 in double density (8" drive).

It is also possible to reformat only the VTOC, on a previously formatted disk. This takes approximately 3 seconds instead of the usual 40 seconds.

**4.** Duplicate Disk, will sense if your destination disk is of the same format as your source disk and will reformat your destination disk, if required.

**5.** Binary Load, includes the option to load but not run a binary file. It will also report the load addresses present in a binary file.

**6.** An online help facility for each command.

Besides the commands shared by DOS 2 and TOPDOS, there are some significant additions. Directly from the main menu you can build "command files" similar to the batch processing files of DOS XL. These command files can call other command files, something DOS XL won't allow. There is a mini-monitor which allows the user to examine and modify specific bytes of memory, and a trouble option to translate cryptic error numbers into brief English explanations.

The "Set/Status" command reveals a TOPDOS customizing menu. Just a few of the options include definition of drive density and system drive number, residence on/off (resident TOPDOS uses 9–10K.), bypass cartridge allowing the user to bypass the cartridge on boot-up and directly access the TOPDOS menu, and such bells and whistles as change left margin and redefine command prompt.

The Axlon Ramdisk and the Mosaic 64 board are fully supported with some versatile options. One can use the Ramdisk in single or double density, change the drive number of the Ramdisk, define it as the system drive, and define which 16K banks are active.

A summary of system status can be called by typing [/] [RETURN]. The status summary includes: the number and density of online drives, current system drive number, the current MEMLO and MEMTOP, number of disk buffers, TOPDOS or Atari disk format, MEM.SAV on or off, DOS resident on or off, cartridge bypass on or off and write verify on or off.

Describing all the subtleties would take about 82 pages (the length of the TOPDOS documentation). I have a feeling that many people will convert to this product as they are exposed to its many fine features.

## WHAT TO BUY?

Before you buy any DOS, keep in mind that some kind of DOS is going to come with (or came with) your disk drive, making it essentially free. If you're going to buy an additional DOS, examine your needs and look for a product that fits your purposes. Certain things, like special hardware requirements, narrow the field. And ease of use is important.

One personal opinion (shared by the **Antic** editors): Don't waste your time with Atari DOS 3!

Atari DOS 2.5 will surely be a hit with many users because its performance (very good) to price ($0.00) ratio is tough to beat. Just keep in mind that DOS 2.5 won't do everything! There may be a DOS out there more suited to your needs that's deserving of your hard-earned money.

*Eric Clausen has owned his Atari since January, 1982. He is a member of ABACUS, the San Francisco users group, and he recently received his dentistry degree from the University of the Pacific. Eric plans to continue his medical training toward a PhD in medicine.*

### MANUFACTURERS

ATARI DOS 2.5
Atari Corp.
1196 Borregas Avenue
Sunnyvale, CA 94088-3427
(408) 745-2000
Send in your DOS 3.0 Master Disk for exchange.

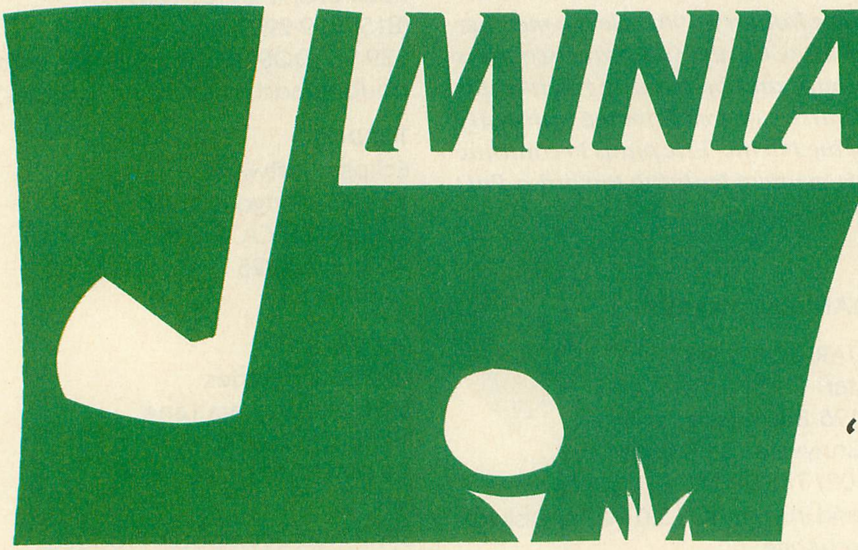
SMARTDOS
Astra Systems
2500 South Fairview, Unit L
Santa Ana, CA 92704
(714) 549-2141
Packaged with Astra drives.

SPARTADOS
ICD, Inc.
1220 Rock Street, Suite 310
Rockford, IL 61101-1437
(815) 229-2999
$39.95 DOS alone, $69.95 with doubler(add $4 shipping to either)

TOPDOS
Eclipse Software
1058-G Marigold Court
Sunnyvale, CA 94086
(408) 246-8325
$49.95

MYDOS
Newell Industries
3340 Nottingham Lane
Plano, TX 75074
(214) 423-1781
or
S.W.P. Microcomputer Products
1000 W. Fuller
Ft. Worth, TX 76115
(817) 924-7759
$39.95

**game of the month**



# MINIATURE GOLF

## Plus golf course "construction set"

by DAVID PLOTKIN

*Play 8 holes of Atari miniature golf on your Atari and then design your own golf course. Two BASIC programs (Golf and Construction Set) run on all Atari computers with 24K cassette or 32K disk. Disk or cassette. You'll also need your trusty joystick as a golf club.*

When you get tired of dodging demented robots, skulking around caves and frying alien creatures, try your aim at miniature golf, a surprisingly holesome (ouch) game for the entire family.

There's no real limit to the number of players—you could even take this game to a party, along with last month's "Beer Party Atari!" The computer will keep track of each golfer's scores and turns to play.

But first, type in Listing 1, check it with TYPO II and SAVE a copy before you RUN it.

Swing your club by moving the joystick. The club appears as a square with a missing corner. Pushing the joystick button starts your shot. The farther the distance between the club and the ball, the harder the ball will be hit. This means you can try some interesting bounce shots.

The important part of the club is the missing corner. The velocity is calculated from the distance between this corner and the ball; the direction the ball travels is also calculated from the corner.

Holes-in-one are possible on all the holes provided.

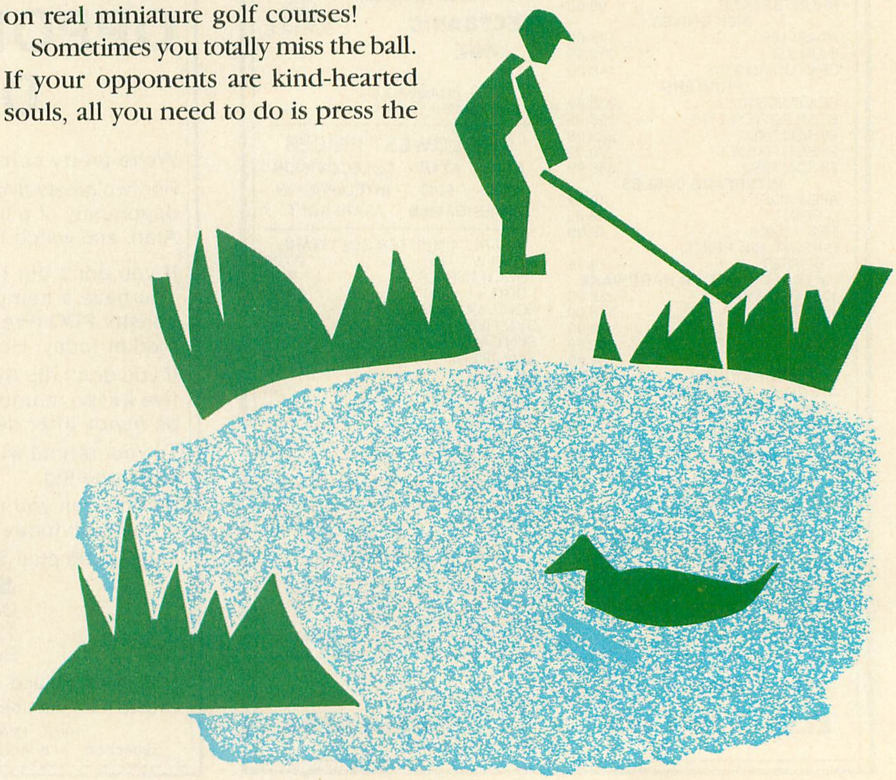
When you sink the ball, play moves to the next player, until all players have played all the holes. The game is then over, and a screen display shows everyone's score plus the name of the winner.

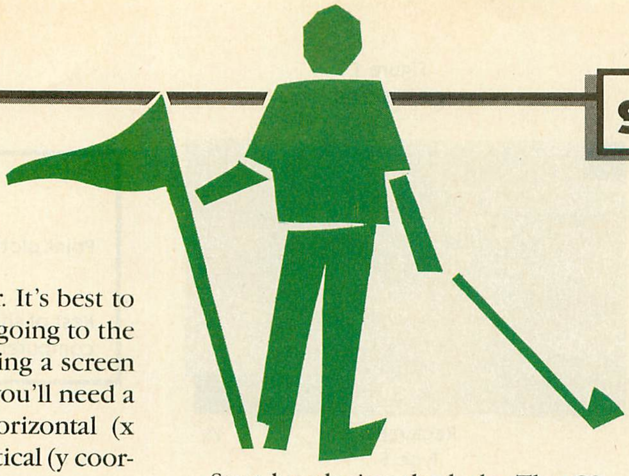
To add additional realism to the course, there is a moving barrier, reminiscent of the windmills found on real miniature golf courses!

Sometimes you totally miss the ball. If your opponents are kind-hearted souls, all you need to do is press the START button—and you can take the shot over again. These extra shots don't even show up on your score.

### GOLF CONSTRUCTION

Eventually you'll want to design your own holes. That's when you can use the Miniature Golf Construction Set (CS), which generates data statements that are appended to the MG program in line 2000. To use CS, type in Listing 2, check it with TYPO II, and SAVE a copy.





Start with graph paper. It's best to design your hole before going to the computer. You're designing a screen for Graphic Mode 7, so you'll need a grid spanning 0–159 horizontal (x coordinate) and 0–79 vertical (y coordinate).

In constructing a hole, you choose from seven types of prefabricated obstacles (see *Figure 1)*. These include four types of right triangles—right, left, up and down, named according to the direction that the apex points. The fifth obstacle is a rectangle, the sixth is a diagonal line, and the seventh a moving barrier. In each case, you determine where to put the obstacle and how big it should be.

When you first run CS, it will ask you where you want your output. Either give D:FILENAME (or C: for cassette). The screen will also request the hole number.

You'll then be asked where you want the hole placed, first with the x position coordinate and then the y coordinate. The program will always specify the information and format it wants.

After locating the hole, specify the starting position for the ball, again by entering the x and then the y coordinates.

With these starters completed, you can place the obstacles. The CS program will run through a sequence, offering you a chance to include down triangles, up triangles, squares, and so on. In each case, you are asked how many obstacles (0–15 of each), and are then led through the process of locating each one.

## SAMPLE DESIGN

Let's create a sample hole. When asked for a hole number, type [1] [RETURN]. Look at *Figure 2* for a sample design. Let's say you want your field to have five objects: a down triangle, an up triangle, a rectangle, a diagonal barrier and a moving obstacle.

Start by placing the hole. The CS program will prompt you to enter x, then y. Type [20] [RETURN] [20] [RETURN]. Place the ball at, say, 150,60 by typing [150] [RETURN] [60] [RETURN].

You'll now be asked how many down triangles you want. Enter [1] and a [RETURN]. Specify the position by locating the baseline—because it's a right triangle, the computer will do the rest. Enter the coordinates in the format requested, with a comma between each number and a [RETURN] at the end of the entry. Thus, a small down triangle in the upper right corner of the field would be 141,0,159.

Establishing an up triangle works the same way. Choose [1] up triangle, then enter 40,79,141 [RETURN] to get the large triangle in Figure 2.

If you don't want a certain obstacle, enter [0] when asked "How many?". For this sample, we don't want any right or left triangles.

Choose [1] square/rectangle then specify the square's location by naming the two corners: 70,0,120,20.

The barrier starts with a yes/no choice. Choose [1], and then establish the length of the line along which the barrier moves, as well as the speed it moves. Higher numbers are faster. Use 5,40,60 for the placement and 3 for the speed.

The diagonal lines are located by specifying a corner's x and y coordinates, followed by the lower x position. Try 5,50,26.

When you're finished making a fiendishly difficult hole, you'll be presented with the main menu, which has four choices. The first thing you'll want to do is look at the hole you've just constructed.

If the program encounters any errors attempting to draw the screen, it will stop and let you look at the screen to try to figure out what went wrong. The most common error is to place a triangle too close to the screen edge, so that when the computer attempts to draw the missing corner, you get a cursor out of range.

Touching any key returns you to the main menu, where you may wish to use the second selection, Edit. This takes you to a submenu with a list of obstacles to edit. You must re-enter ALL the data for the particular obstacle you are editing. To return to the main menu, choose option 9 from the submenu.

The third choice lets you Save your data. The final choice is to Quit. If you make this choice by accident, however, all is not lost. Just type GOTO 240 and press [RETURN].

## PLAYING NEW HOLES

Now that you've gone through all this

continued on next page

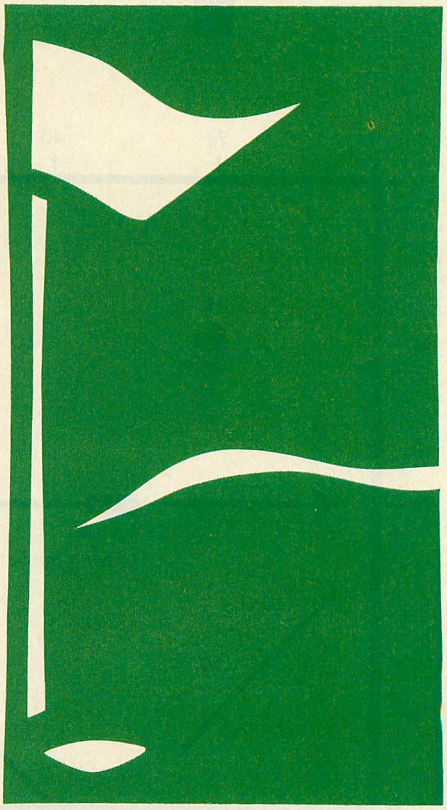


Figure 1
**OBSTACLES**

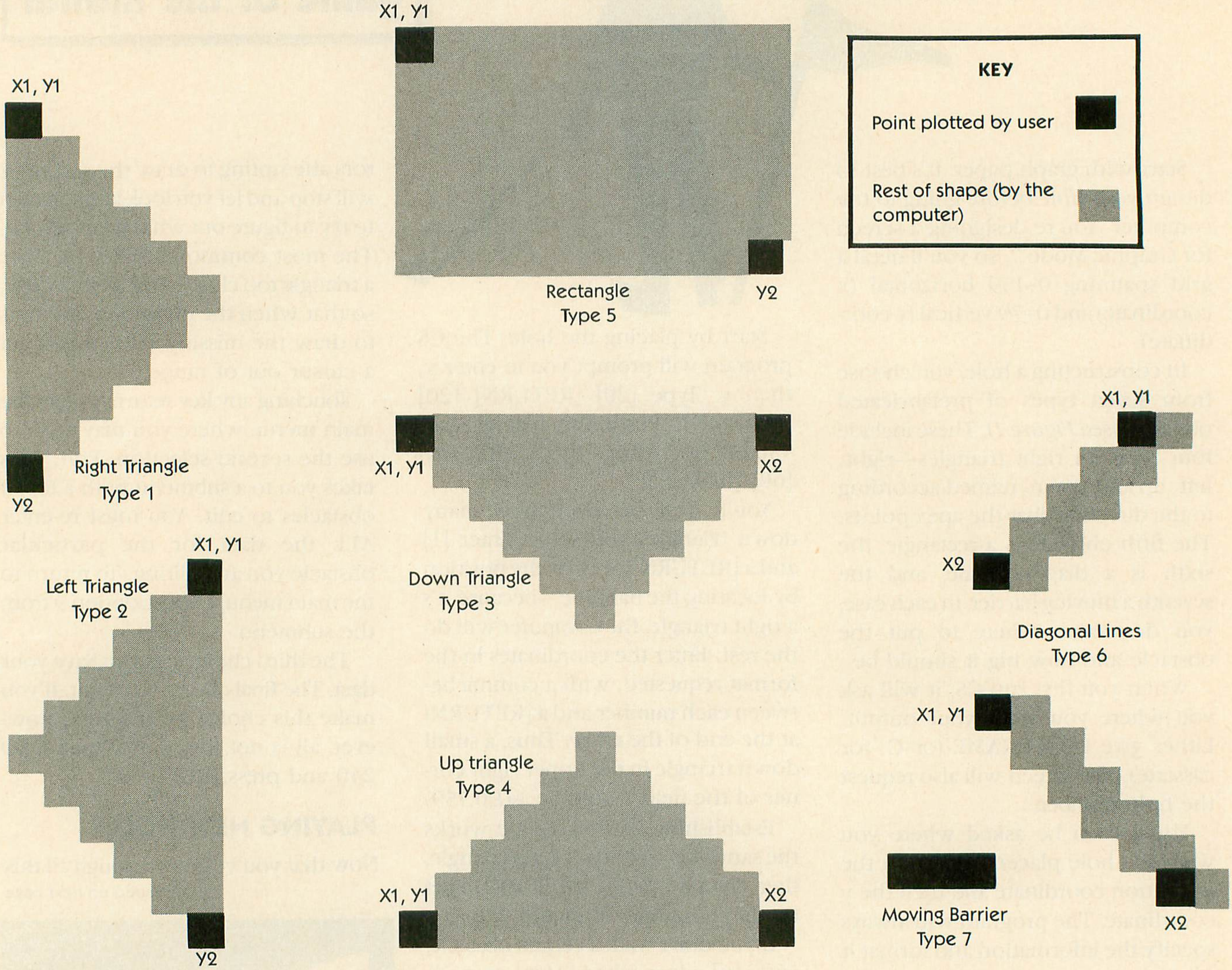
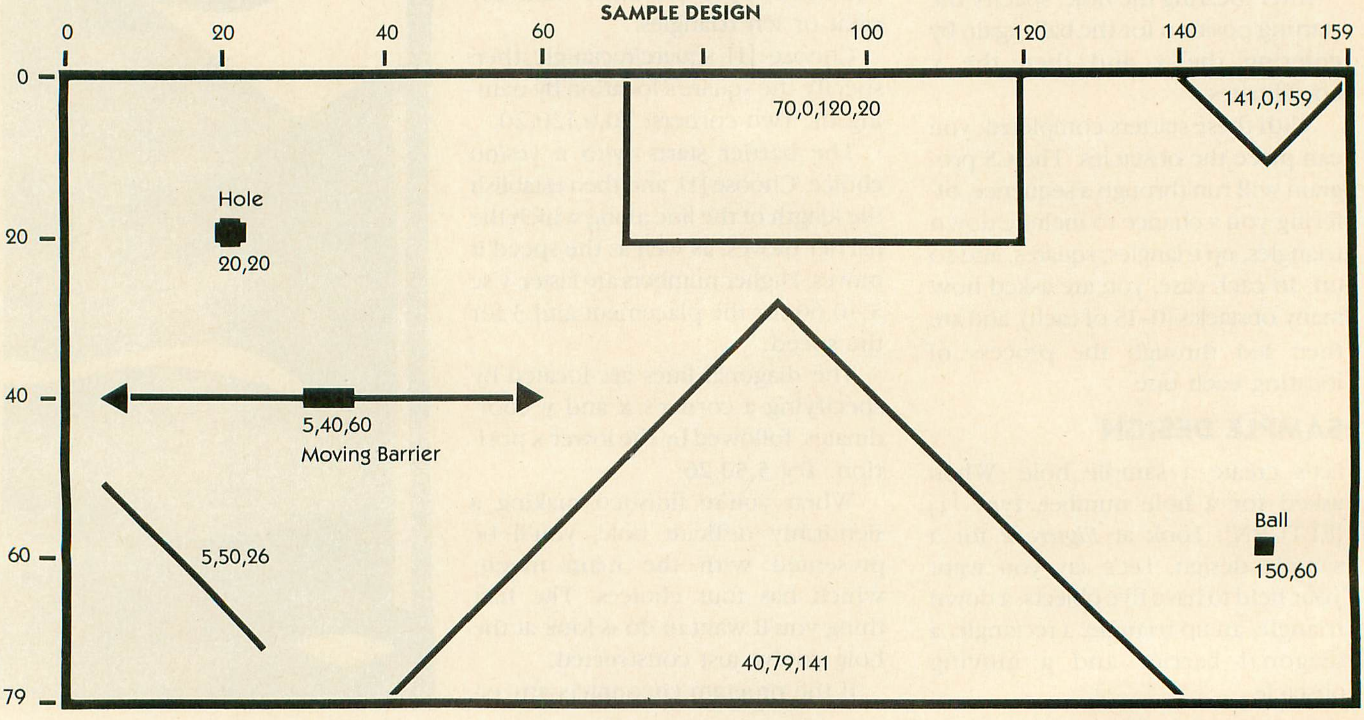



Figure 2
**SAMPLE DESIGN**



work to generate the data, how do you use it? First, LOAD or CLOAD Miniature Golf into your computer. Then ENTER "D:FILENAME" or ENTER "C:" the data created using MGCS. For example, if you used D:ROUND for the filename to save your data when using CS, then you would ENTER "D:ROUND". If you are adding more holes, then you will need to adjust the variable MAXHOLE in line 10 of Miniature Golf.

Then SAVE the version with the new hole data, and RUN it. Be warned that if you chose to create a hole number using CS that already exists in your current version of Miniature Golf, your new hole will replace the old one. This change becomes rather permanent if you then write the new version with the same filename as the old one back to the same disk.

## LIST OF VARIABLES

**F1**—flag so that you can't keep pressing the START button and back up your score.

**STARTHOLE, MAXHOLE**—the hole to start on and the final hole.

**PN, NUMPLAY**—the current player number, and the total number of players.

**HOLSCR**—the current hole score.

**HOLENUM**—the current hole number.

**TOTAL**—array which holds each player's score.

**OLDX, OLDY**—the ball's x and y coordinates before your last shot.

**BALLX, BALLY**—ball's x and y coordinates.

**MX, MY**—ball's x and y velocities.

**HX, HY, HSX, HSY**—the magnitude and sign of the ball's x and y velocities.

**BX, BY**—moving barrier's x and y coordinates.

**RITEX, LEFTX, SPEED**—the moving barrier's limits of back-and-forth motion, and the speed of movement.

**CLUBX, CLUBY**—x and y coordinates of the club.

**CLUB$, BARRIER$, HOLE, BALL$, BLANK$**—arrays to hold the shape data of appropriate items.

**UD1$, UD2$, UD3$**—arrays which hold the data for the machine language routines to move the players (ball, club, barrier).

**NAME$**—array to hold the names of each player.

## PROGRAM TAKE-APART

**5-15** Set up and call the subroutines to get information.

**20-50** Main Loop. For each hole (line 20), it updates the text window and draws the hole (line 30). Each player moves the club and shoots (line 40). Then erases the hole (line 50).

**60** Jump to Game Over routine.

**700-790** Moves the ball around the field. If a collision is detected with the playfield or the moving barrier then velocities are adjusted. If the ball goes in the hole, calls the subroutine at 850. Note that lines 775-776 do exactly the same thing as the subroutine at line 800 (move the moving barrier), but at a 25% increase in speed, because you don't have to call a subroutine.

**850-880** Sound and graphics for the ball going into the hole.

**900-990** Moves the club when you move your joystick. It reads the joystick (lines 910–920), checks the status of the START button and the flag (line 925), adjusts and redraws the ball and club if the [START] button is pushed the *first* time, and erases and redraws the club (930). If the button is pushed, lines 940-960 calculate the x and y distances between the club and ball, and "swing" the club. Note that if the club and the ball have the same coordinates, you get a nasty beep.

**1000-1090** Read the data that defines each hole and draws the hole, including the club and ball.

**1100-1130** Draws a type one or two obstacle.

**1200-1230** Draws a type three or four obstacle.

**1300-1330** Draws a type five obstacle.

**1400-1420** Draws a type six obstacle.

**1430-1440** Draws a type seven obstacle.

**1450-1490** Erases the P/M shapes by writing zeros from BLANK$ into their positions.

**1500-1550** Gets the names of the players. This routine has you input the names into a temporary string, then pads any unused spaces (up to 10) with blanks so that each name is the same length. That way, we can find the name in the larger string NAME$.

**1600-1735** Sets up the graphics, memory and P/M space and enables P/M graphics. It also reads the shape data into the arrays, and reads the machine language routine data into their arrays.

**1750-1770** Updates the text window.

**2000-2141** Data for the holes.

**3000-3050** The introductory screen.

**3100-3320** The Game Over sequence.

*David Plotkin, a regular contributor to* ***Antic****, has recently been noted for his ACTION! games in these pages. He is a chemical engineer by profession.*

Listing on page 64

**SLIDE**
continued from page 33

it is also important for a program to function quickly. The program needs to take as few moves as possible to win. One idea here is to always prune the tree of possible moves that are identical to the previous move—the program shouldn't spend its time retracing its steps.

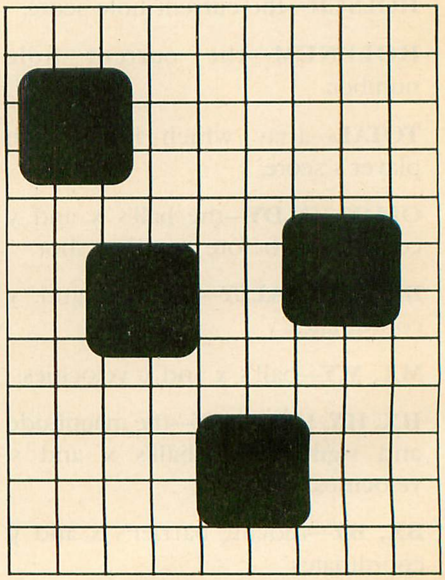
The hardest part of intelligent game design here is to produce a reasonable quiescence function, the subroutine that prunes branches that don't seem fruitful.

Your function will be measured by the number of spurious nodes that are expanded to a solution en route—the perfect function will always prune all spurious nodes. The worst function will expand each node at one level in the tree before looking to the next level—this is called an exhaustive search, and wastes computer time and memory.

If the design of "artificial intelligence" intrigues you, why not see if you can use this puzzle program as a starting point for your own program which *solves* the 24 Puzzle? **Antic** would be interested in publishing the shortest and most elegant solution sent in by a reader.

*Mark Moore is from Weatherford, Oklahoma and this is his first publication in Antic.*

Listing on page 56.



# SOFTWARE LIBRARY

**Antic** type-in listing section includes every full-length program from this issue. Listings are easier to type and proofread, easy to remove and save in a binder if you wish.



***DISK SUBSCRIBERS:*** You can use all these programs immediately. Just follow the instructions in the accompanying magazine articles.




Antic program listings are typeset on the Star SG-10 Printer, from Star Micronics, Inc., 200 Park Avenue, New York, NY 10166.

# TYPING SPECIAL ATARI CHARACTERS

**Antic** printed program listings leave a small space between each Atari Special Character for easier reading. Immediately below you will see the way **Antic** prints all the standard Atari letters and numbers, in upper and lower case, in normal and inverse video.

```
ABCDEFGHIJKLMNOPQRSTUVWXYZ
ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
abcdefghijklmnopqrstuvwxyz
0123456789          0123456789
```

The Atari Special Characters and the keys you must type in order to get them are shown in the two boxes below. (Squares are drawn around the normal video characters so you can see their positions more accurately, these squares will not appear in listings.)

**NORMAL VIDEO**

| FOR THIS | TYPE THIS | FOR THIS | TYPE THIS |
|---|---|---|---|
| | CTRL , | | CTRL T |
| | CTRL A | | CTRL U |
| | CTRL B | | CTRL V |
| | CTRL C | | CTRL W |
| | CTRL D | | CTRL X |
| | CTRL E | | CTRL Y |
| | CTRL F | | CTRL Z |
| | CTRL G | | ESC ESC |
| | CTRL H | | ESC CTRL - |
| | CTRL I | | ESC CTRL = |
| | CTRL J | | ESC CTRL + |
| | CTRL K | | ESC CTRL * |
| | CTRL L | | CTRL . |
| | CTRL M | | CTRL ; |
| | CTRL N | | SHIFT = |
| | CTRL O | | ESC SHIFT CLEAR |
| | CTRL P | | |
| | CTRL Q | | |
| | CTRL R | | ESC DELETE |
| | CTRL S | | ESC TAB |

**INVERSE VIDEO**

| FOR THIS | TYPE THIS | FOR THIS | TYPE THIS |
|---|---|---|---|
| | Λ CTRL , | | Λ CTRL Y |
| | Λ CTRL A | | Λ CTRL Z |
| | Λ CTRL B | | ESC SHIFT DELETE |
| | Λ CTRL C | | |
| | Λ CTRL D | | |
| | Λ CTRL E | | ESC SHIFT INSERT |
| | Λ CTRL F | | |
| | Λ CTRL G | | |
| | Λ CTRL H | | ESC CTRL TAB |
| | Λ CTRL I | | |
| | Λ CTRL J | | |
| | Λ CTRL K | | ESC SHIFT TAB |
| | Λ CTRL L | | |
| | Λ CTRL M | | |
| | Λ CTRL N | | Λ CTRL . |
| | Λ CTRL O | | Λ CTRL ; |
| | Λ CTRL P | | Λ SHIFT = |
| | Λ CTRL Q | | ESC CTRL 2 |
| | Λ CTRL R | | ESC CTRL DELETE |
| | Λ CTRL S | | |
| | Λ CTRL T | | |
| | Λ CTRL U | | ESC CTRL INSERT |
| | Λ CTRL V | | |
| | Λ CTRL W | | |
| | Λ CTRL X | | |

Whenever the CONTROL key (CTRL on the 400/800) or SHIFT key is used, *hold it down* while you press the next key. Whenever the ESC key is pressed, *release* it before you type the next key.

Turn on inverse video by pressing the Reverse Video Mode Key. Turn it off by pressing it a second time. (On the 400/800, use the Atari Logo Key instead.) Note: In the printed listings, inverse characters will be slightly smaller than the normal ones.

Among the most common program typing mistakes are switching certain capital letters with their lower-case counterparts—you need to look especially carefully at P, X, O and 0 (zero).

Some of Atari Special Characters are not easy to tell apart from standard alpha-numeric characters. Usually the Special Characters will be *thicker* than the alpha-numerics. Compare the two sets of characters below:

| SPECIAL | | STANDARD | |
|---|---|---|---|
| | CTRL F | | / |
| | CTRL G | | SHIFT + |
| | CTRL N | | SHIFT - |
| | CTRL R | | - |
| | CTRL S | | + |

# HOW TO USE TYPO II

Type in TYPO II and SAVE a copy to disk or cassette.

Type GOTO 32000 and follow TYPO II onscreen instructions. If the resulting two-letter line codes are not exactly the same as those in the magazine, you mistyped something in that line.

To call back any line previously typed, type an asterisk [*] followed (without in-between spaces) by the line number, then press [RETURN]. When the complete line appears at the top of the screen, press [RETURN] again. This is also the way you use TYPO II to proofread itself.

To LIST your program, press [BREAK] and type LIST. To return to TYPO II, type GOTO 32000.

To remove TYPO II from your program, type LIST "D:FILENAME",0,31999 [RETURN] (Cassette owners LIST "C:). Type NEW, then ENTER "D:FILENAME" [RETURN] (Cassette—ENTER "C:). Your program is now in memory without TYPO II and you can SAVE or LIST it to disk or cassette.

Owners of the BASIC XL cartridge from O.S.S. type SET 5,0 and SET 12,0 before using TYPO II.

Don't type the TYPO II Codes!

```
WB 32000 REM TYPO II BY ANDY BARTON
VM 32010 REM VER. 1.0 FOR ANTIC MAGAZINE
HS 32020 CLR :DIM LINE$(120):CLOSE #2:CLO
   SE #3
BN 32030 OPEN #2,4,0,"E":OPEN #3,5,0,"E"
YC 32040 ? "K":POSITION 11,1:? "TYPO II"
EM 32050 TRAP 32040:POSITION 2,3:? "Type
   in a program line"
HS 32060 POSITION 1,4:? " ":INPUT #2;LINE
   $:IF LINE$="" THEN POSITION 2,4:LIST B
   :GOTO 32060
XH 32070 IF LINE$(1,1)="*" THEN B=VAL(LIN
   E$(2,LEN(LINE$))):POSITION 2,4:LIST B:
   GOTO 32060
TH 32080 POSITION 2,10:? "CONT"
MF 32090 B=VAL(LINE$):POSITION 1,3:? " ";
NY 32100 POKE 842,13:STOP
CN 32110 POKE 842,12
```

Don't type the TYPO II Codes!

```
ET 32120 ? "K":POSITION 11,1:? " TYPO II
   ":POSITION 2,15:LIST B
CE 32130 C=0:ANS=C
QR 32140 POSITION 2,16:INPUT #3;LINE$:IF
   LINE$="" THEN ? "LINE ";B;" DELETED":G
   OTO 32050
VV 32150 FOR D=1 TO LEN(LINE$):C=C+1:ANS=
   ANS+(C*ASC(LINE$(D,D))):NEXT D
WJ 32160 CODE=INT(ANS/676)
JW 32170 CODE=ANS-(CODE*676)
EH 32180 HCODE=INT(CODE/26)
BH 32190 LCODE=CODE-(HCODE*26)+65
HB 32200 HCODE=HCODE+65
IE 32210 POSITION 0,16:? CHR$(HCODE);CHR$
   (LCODE)
VG 32220 POSITION 2,13:? "If CODE does no
   t match press RETURN and edit line a
   bove.":GOTO 32050
```

# ERROR FILE

### *KWIK DUMP*

*March 1985*

The last number in line 1070 should be 27 instead of zero.

### *WIDE TEXT*

*January 1985*

Substitute the following lines to print wide Z's.
In assembly:

```
0600        CPY #27*
8    ;8 BYTES TO A
 LETTER
```

In BASIC:

```
CT 20130 DATA 216
,208,213,185,0,22
4
```

### *S.A.M. SOURCE CODE*

*February 1985*

In line 900 of the source code, LDY $01 should be changed to LDY #01.

### *KOOKY'S QUEST*

February '85

The following line is missing:
2100 FOR S=32 TO 16 STEP −4: SOUND 0,S,14,10: EA=EA*EA*EA: SOUND 0,0,0,0: EA=1 ∧0:NEXT S

### *BUS OVERLINES*

Some signals and address labels were printed without overlines in Part III of Earl Rice's Parallel Bus Revealed" (**Antic**, March 1985).

These are the correct labels:

$\overline{\text{D8XX-DFXX}}$
$\overline{\text{CS}}$ (CHIP RESET)
R/$\overline{\text{W}}$
$\overline{\text{D1XX}}$
$\overline{\text{RDE}}$ (READ DATA ENABLE)
$\overline{\text{DS}}$ (DATA STROBE)
$\overline{\text{DRST}}$ (DEVICE RESET)

### *ADVENT X-5*

November '84

Missing line: 8020 RUN. Also, cassette owners should change the 138 in line 4005 to 130. The TYPO II code for line 1005 is EJ.

### *ADVENTURE ISLAND*

November '84

Line 837 is missing its last item of data, a 4. Also, it will not run with DOS XL.

# TYPO II UPDATE

Since **Antic** began using the improved TYPO II proofreading program in January 1985, we have been getting letters asking for TYPO II codes to some of the most popular pre-1985 programs.

Below you'll find the line-by-line codes—just the codes—for "Biffdrop" (December, 1984), "Escape from Epsilon" (April, 1984), "Advent X-5" (November, 1984) and "Adventure Island" (November, 1984). We'll print additional TYPO II updates if we get enough requests. Enjoy.

## ESCAPE FROM EPSILON

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NG | 10 | FF | 200 | SX | 455 | MG | 606 | FS | 645 | UC | 705 | MB | 3002 | LD | 4030 |
| BL | 20 | JZ | 202 | VC | 460 | LN | 607 | HH | 646 | CV | 710 | HS | 3003 | KS | 4034 |
| RH | 30 | ZK | 204 | VV | 465 | KH | 611 | GG | 650 | HX | 715 | CP | 3004 | IO | 4041 |
| ND | 40 | WB | 210 | MW | 470 | RX | 612 | DC | 651 | DC | 720 | IA | 3005 | OV | 4050 |
| AK | 100 | JL | 212 | US | 500 | ID | 613 | PN | 652 | UF | 725 | CX | 3006 | LU | 4057 |
| OQ | 105 | ZM | 214 | CZ | 505 | MQ | 615 | LX | 655 | DJ | 730 | MR | 3009 | MN | 4063 |
| UQ | 110 | WM | 220 | MF | 510 | RA | 616 | HS | 656 | WP | 800 | CG | 3011 | NQ | 4071 |
| ZY | 115 | ZI | 222 | JO | 550 | CQ | 617 | TV | 657 | ZT | 805 | MI | 3016 | CE | 4080 |
| CV | 120 | CI | 300 | PX | 555 | JJ | 620 | TI | 658 | JW | 810 | DS | 3039 | CN | 5000 |
| VY | 125 | LG | 305 | DT | 560 | BA | 621 | CS | 659 | LW | 850 | IA | 3042 | TS | 5050 |
| LK | 130 | AD | 310 | SV | 565 | AD | 622 | WE | 660 | UM | 900 | DM | 3056 | RD | 5100 |
| RI | 135 | UI | 325 | YE | 570 | UB | 630 | TT | 661 | JO | 905 | GM | 3060 | NO | 5103 |
| NG | 140 | KM | 330 | QK | 575 | PO | 631 | EF | 662 | GI | 910 | IZ | 3076 | QK | 5107 |
| OR | 145 | OR | 335 | ZI | 580 | LL | 632 | LA | 663 | DT | 915 | CI | 4007 | JF | 5150 |
| NK | 150 | JN | 350 | YU | 585 | GN | 633 | XE | 664 | WK | 920 | JI | 4008 | DL | 5163 |
| YJ | 155 | CX | 355 | UP | 600 | BU | 635 | DG | 690 | RL | 925 | HT | 4009 | CQ | 6001 |
| KB | 160 | LU | 360 | IP | 601 | PP | 636 | UA | 691 | ES | 930 | IV | 4012 | ZK | 6002 |
| YO | 165 | DJ | 375 | RY | 602 | OQ | 637 | GD | 692 | NQ | 2000 | JA | 4014 | JF | 6003 |
| YA | 170 | WG | 380 | JJ | 603 | HZ | 640 | MV | 693 | QE | 2005 | IY | 4015 | BV | 6004 |
| ZU | 175 | IM | 400 | PA | 604 | OG | 641 | WS | 694 | ZE | 2010 | JU | 4022 | IU | 6005 |
| MV | 180 | PH | 450 | WZ | 605 | DY | 642 | YI | 700 | RY | 2015 | MC | 4025 | | |

## ADVENT X-5

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| XC | 1 | CV | 180 | XW | 380 | UK | 555 | VY | 905 | IT | 9011 | SS | 9504 | FY | 9536 |
| DY | 2 | TZ | 185 | SC | 381 | QM | 600 | SB | 1000 | MW | 9012 | DD | 9505 | AC | 9537 |
| QK | 3 | CV | 190 | WF | 382 | MU | 605 | EJ | 1005 | LW | 9013 | ZX | 9506 | GR | 9538 |
| WH | 5 | DY | 200 | PB | 383 | RH | 649 | HX | 1010 | NP | 9014 | PE | 9507 | II | 9539 |
| CE | 10 | YN | 205 | KJ | 384 | EB | 650 | VD | 1015 | KK | 9015 | UH | 9508 | VV | 9540 |
| ZJ | 15 | LX | 210 | HH | 390 | ZU | 700 | GN | 1020 | FS | 9016 | PE | 9509 | IA | 9541 |
| LP | 20 | YT | 215 | TM | 392 | TF | 705 | JE | 1025 | VI | 9017 | OP | 9510 | QL | 9542 |
| UD | 25 | HZ | 220 | UF | 393 | XE | 710 | SC | 1030 | ZV | 9018 | TH | 9511 | CX | 9543 |
| PN | 30 | CP | 225 | RO | 399 | PH | 715 | CP | 1035 | XV | 9019 | FH | 9512 | DB | 9544 |
| BR | 50 | KP | 230 | TZ | 400 | ZH | 720 | PO | 1100 | RN | 9020 | BW | 9513 | DF | 9545 |
| NQ | 55 | BH | 240 | LY | 405 | LU | 725 | WJ | 1105 | XY | 9021 | GK | 9514 | DJ | 9546 |
| ZW | 60 | CW | 250 | FG | 410 | ES | 730 | HD | 2000 | RL | 9022 | SC | 9515 | GZ | 9547 |
| CO | 100 | SQ | 255 | YV | 415 | ZX | 750 | BS | 2005 | GM | 9023 | IL | 9516 | HD | 9548 |
| CV | 105 | HF | 260 | CD | 420 | LT | 755 | HM | 3000 | JV | 9024 | WU | 9517 | HH | 9549 |
| ZO | 110 | UT | 265 | RU | 450 | GW | 775 | JH | 3005 | IQ | 9025 | BR | 9518 | GA | 9550 |
| QR | 112 | GL | 270 | LW | 455 | WW | 780 | BB | 4000 | XE | 9026 | MH | 9519 | GE | 9551 |
| HM | 115 | DQ | 275 | LU | 460 | CJ | 785 | IK | 4005 | XK | 9027 | GA | 9520 | GI | 9552 |
| FL | 117 | UT | 280 | YJ | 500 | ZJ | 800 | WF | 4010 | TU | 9028 | SY | 9521 | VM | 9553 |
| HN | 120 | AO | 285 | JL | 502 | AM | 805 | BB | 5000 | IW | 9029 | WL | 9522 | VQ | 9554 |
| HK | 125 | LB | 290 | YS | 505 | RR | 810 | KB | 8000 | MJ | 9030 | IS | 9523 | VU | 9555 |
| NT | 126 | HK | 300 | AW | 507 | YT | 815 | SC | 8010 | GQ | 9031 | WG | 9524 | VY | 9556 |
| LC | 130 | XK | 301 | WS | 510 | QQ | 820 | MZ | 8020 | JJ | 9032 | IK | 9525 | WC | 9557 |
| GB | 145 | HU | 350 | JL | 517 | YF | 825 | PZ | 9001 | JQ | 9033 | VJ | 9526 | WG | 9558 |
| TF | 147 | GZ | 352 | WO | 522 | CE | 830 | WY | 9002 | PJ | 9034 | AO | 9527 | HO | 9559 |
| HX | 150 | LI | 355 | OX | 525 | UZ | 835 | LW | 9003 | AN | 9035 | DY | 9528 | GH | 9560 |
| LL | 154 | MF | 357 | UW | 526 | PF | 840 | WC | 9004 | YZ | 9036 | WV | 9529 | PL | 9561 |
| RT | 155 | RL | 360 | HE | 527 | CJ | 845 | VK | 9005 | EJ | 9037 | ZA | 9530 | BM | 9562 |
| RD | 160 | WS | 365 | NR | 530 | IW | 850 | LC | 9006 | MB | 9038 | HJ | 9531 | ME | 9997 |
| EO | 165 | JN | 367 | HA | 535 | FX | 855 | AK | 9007 | WD | 9039 | YK | 9532 | ZU | 9998 |
| BW | 170 | WA | 370 | BZ | 545 | XL | 860 | HU | 9008 | AI | 9501 | QC | 9533 | YC | 9999 |
| KH | 175 | PT | 375 | AS | 550 | QH | 865 | IO | 9009 | SV | 9502 | PB | 9534 | VM | 10000 |
| | | | | | | QD | 900 | TZ | 9010 | WX | 9503 | SF | 9535 | PI | 15000 |

# ADVENTURE ISLAND

| | |
|---|---|
| OQ | 0 |
| VK | 1 |
| BH | 2 |
| QN | 3 |
| QO | 4 |
| QO | 5 |
| ZL | 6 |
| XF | 7 |
| TB | 8 |
| TS | 10 |
| QY | 12 |
| OR | 13 |
| JU | 14 |
| MI | 15 |
| LJ | 16 |
| UY | 17 |
| TE | 18 |
| RT | 19 |
| RR | 20 |
| FQ | 40 |
| XO | 59 |
| RV | 64 |
| AE | 65 |
| EW | 66 |
| SM | 90 |
| PF | 91 |
| UV | 92 |
| RU | 93 |
| KP | 94 |
| FR | 95 |
| PW | 96 |
| FJ | 97 |
| FH | 98 |
| JJ | 99 |
| NB | 100 |
| ZF | 101 |
| OD | 102 |
| GV | 103 |
| YV | 104 |
| RE | 106 |
| AQ | 108 |
| JG | 109 |
| GZ | 110 |
| NX | 111 |
| IR | 120 |
| YU | 121 |
| YT | 122 |
| GY | 125 |
| DC | 126 |
| BH | 127 |
| AW | 130 |
| WH | 149 |
| DP | 150 |
| WO | 151 |
| RA | 153 |
| VP | 154 |
| AQ | 155 |
| XV | 199 |
| TJ | 200 |
| OO | 201 |
| AR | 205 |
| HT | 206 |
| UU | 207 |
| VK | 208 |
| CL | 209 |
| YD | 210 |
| FT | 211 |
| LC | 213 |
| LD | 270 |
| AA | 271 |
| IT | 272 |
| BO | 277 |
| OV | 278 |
| RL | 279 |
| DD | 280 |
| YU | 281 |
| NA | 283 |
| AC | 285 |
| OX | 300 |
| OC | 305 |
| VL | 310 |
| ZQ | 315 |
| FK | 340 |
| PB | 341 |
| TM | 342 |

| | |
|---|---|
| RQ | 344 |
| IJ | 346 |
| VJ | 348 |
| TD | 349 |
| CS | 350 |
| MN | 352 |
| ZS | 353 |
| XV | 360 |
| LL | 362 |
| YB | 363 |
| DP | 366 |
| RP | 367 |
| CV | 369 |
| GP | 370 |
| KU | 371 |
| GL | 372 |
| ET | 373 |
| GP | 374 |
| BW | 375 |
| UA | 376 |
| NW | 377 |
| JC | 378 |
| BX | 379 |
| ZU | 380 |
| SB | 400 |
| BI | 402 |
| FZ | 403 |
| JW | 404 |
| TX | 405 |
| AZ | 406 |
| ZV | 407 |
| ND | 420 |
| AA | 421 |
| OP | 422 |
| ZN | 423 |
| AP | 430 |
| XE | 431 |
| FD | 432 |
| XG | 433 |
| VI | 434 |
| FP | 435 |
| CF | 436 |
| YG | 437 |
| OV | 438 |
| RU | 439 |
| TE | 440 |
| HA | 441 |
| DI | 442 |
| IC | 443 |
| NK | 444 |
| ZF | 445 |
| SX | 446 |
| ZW | 447 |
| NM | 448 |
| BU | 449 |
| MK | 450 |
| NJ | 452 |
| PV | 453 |
| SB | 454 |
| MN | 455 |
| UE | 457 |
| QP | 470 |
| ID | 472 |
| VZ | 473 |
| AN | 474 |
| RY | 475 |
| NB | 476 |
| YN | 477 |
| GM | 478 |
| NP | 479 |
| MO | 480 |
| XW | 481 |
| ZW | 482 |
| SW | 490 |
| ZV | 491 |
| JD | 500 |
| UO | 501 |
| TV | 502 |
| TK | 505 |
| EX | 506 |
| ZW | 507 |

| | |
|---|---|
| VL | 508 |
| WM | 509 |
| KX | 510 |
| LY | 511 |
| CB | 512 |
| FW | 513 |
| AJ | 514 |
| HG | 517 |
| UO | 518 |
| VK | 519 |
| NH | 520 |
| ZI | 521 |
| WE | 522 |
| ZO | 523 |
| XG | 524 |
| ZU | 525 |
| RR | 526 |
| OV | 530 |
| ZL | 532 |
| EX | 533 |
| FQ | 534 |
| LJ | 535 |
| MX | 536 |
| QZ | 537 |
| OM | 538 |
| JN | 539 |
| FI | 540 |
| YB | 541 |
| VN | 542 |
| JZ | 543 |
| RF | 544 |
| FS | 545 |
| AE | 547 |
| LA | 560 |
| OF | 562 |
| AE | 563 |
| QH | 564 |
| NO | 565 |
| RG | 566 |
| TA | 567 |
| LI | 568 |
| HV | 569 |
| GK | 570 |
| RY | 571 |
| ND | 572 |
| ZY | 573 |
| RC | 580 |
| MF | 581 |
| IX | 582 |
| GD | 583 |
| XH | 584 |
| IF | 585 |
| TM | 586 |
| EU | 587 |
| HL | 588 |
| RV | 589 |
| GK | 590 |
| CD | 591 |
| VR | 592 |
| WC | 594 |
| AL | 596 |
| LK | 601 |
| GU | 602 |
| UA | 603 |
| AO | 614 |
| AA | 615 |
| JA | 617 |
| SR | 620 |
| HE | 621 |
| MF | 624 |
| ZV | 625 |
| DF | 627 |
| AE | 628 |
| TR | 629 |
| MN | 630 |
| SR | 640 |
| TE | 641 |
| NX | 660 |
| EX | 661 |
| HX | 662 |
| SJ | 663 |
| HY | 664 |
| CK | 665 |
| CG | 666 |
| AJ | 667 |

| | |
|---|---|
| FD | 670 |
| XQ | 671 |
| VX | 672 |
| EC | 673 |
| WX | 674 |
| ZZ | 675 |
| AZ | 676 |
| AO | 678 |
| NI | 680 |
| YM | 681 |
| HR | 682 |
| FI | 683 |
| GB | 684 |
| QJ | 685 |
| NI | 686 |
| TU | 687 |
| QD | 688 |
| ZP | 689 |
| CD | 690 |
| DS | 691 |
| FU | 692 |
| ST | 697 |
| FC | 698 |
| TG | 699 |
| NB | 750 |
| UI | 751 |
| KY | 752 |
| KE | 753 |
| HP | 754 |
| JB | 757 |
| YJ | 759 |
| JX | 761 |
| YV | 762 |
| LK | 763 |
| AB | 764 |
| DE | 801 |
| AV | 802 |
| FP | 803 |
| WR | 804 |
| CZ | 805 |
| QL | 806 |
| MC | 807 |
| RF | 808 |
| BZ | 809 |
| EE | 810 |
| VU | 811 |
| BA | 812 |
| GG | 813 |
| AK | 814 |
| UK | 815 |
| NE | 816 |
| AZ | 817 |
| OI | 818 |
| IA | 819 |
| IZ | 820 |
| SE | 821 |
| BZ | 822 |
| UT | 823 |
| JV | 824 |
| VE | 825 |
| MC | 826 |
| XA | 827 |
| RJ | 828 |
| QE | 829 |
| QP | 830 |
| KX | 831 |
| EU | 832 |
| RV | 833 |
| WB | 834 |
| YB | 835 |
| ZF | 836 |
| HF | 837 |
| NS | 838 |
| AE | 844 |
| TR | 901 |
| NR | 902 |
| BN | 903 |
| XR | 904 |
| YW | 905 |
| RQ | 906 |
| AZ | 907 |
| MC | 908 |
| CK | 909 |
| TI | 910 |
| HH | 911 |

| | |
|---|---|
| GU | 912 |
| RL | 913 |
| LU | 914 |
| BO | 915 |
| NQ | 916 |
| LO | 917 |
| LF | 918 |
| CZ | 919 |
| EK | 920 |
| PI | 921 |
| QL | 922 |
| OZ | 923 |
| TN | 924 |
| PJ | 925 |
| PA | 926 |
| AV | 927 |
| ZK | 928 |
| NU | 929 |
| FF | 930 |
| PD | 931 |
| MK | 932 |
| PH | 933 |
| ZP | 934 |
| AV | 935 |
| RQ | 936 |
| OS | 937 |
| BY | 938 |
| QL | 939 |
| NP | 940 |
| AU | 941 |
| OF | 942 |
| MJ | 943 |
| RX | 945 |
| DY | 946 |
| RX | 947 |
| UE | 948 |
| EL | 949 |
| KD | 950 |
| OP | 951 |
| SK | 952 |
| LH | 953 |
| TI | 954 |
| XJ | 955 |
| MA | 956 |
| UF | 957 |
| GT | 958 |
| MZ | 959 |
| QR | 960 |
| DS | 961 |
| TG | 962 |
| UJ | 963 |
| CH | 964 |
| IJ | 965 |
| EN | 966 |
| PY | 967 |
| XP | 968 |
| OH | 969 |
| PN | 970 |
| MD | 971 |
| TX | 972 |
| VH | 999 |
| TI | 1000 |
| WF | 1001 |
| UH | 1002 |
| GR | 1008 |
| AO | 1050 |
| RW | 1100 |
| FN | 1105 |
| IX | 1106 |
| XL | 1109 |
| NU | 1110 |
| LH | 1111 |
| VY | 1112 |
| IT | 1113 |
| OB | 1114 |
| UX | 1115 |
| AB | 1118 |
| VX | 1119 |
| EO | 1120 |
| VQ | 1130 |
| CM | 1199 |
| OD | 1200 |
| GQ | 1205 |
| KI | 1206 |
| XN | 1209 |
| OR | 1210 |

| | |
|---|---|
| LJ | 1211 |
| XK | 1212 |
| ZX | 1213 |
| RB | 1214 |
| KO | 1216 |
| EQ | 1219 |
| CO | 1299 |
| YH | 1300 |
| SH | 1301 |
| MB | 1303 |
| TU | 1304 |
| AH | 1600 |
| PY | 1610 |
| CY | 1620 |
| YW | 1635 |
| OB | 1639 |
| YY | 1640 |
| BR | 1645 |
| LZ | 1649 |
| VJ | 1650 |
| MB | 1660 |
| HX | 1661 |
| HC | 1800 |
| SF | 1810 |
| RJ | 1820 |
| ZA | 1835 |
| QF | 1839 |
| MN | 1840 |
| BV | 1845 |
| MD | 1849 |
| EY | 1850 |
| ZY | 2000 |
| KF | 2002 |
| HI | 2004 |
| FK | 2006 |
| AP | 2050 |
| IB | 2100 |
| SD | 2101 |
| RA | 2110 |
| LA | 2120 |
| YN | 2135 |
| HS | 2140 |
| SQ | 2141 |
| BI | 2145 |
| LQ | 2149 |
| DE | 2150 |
| WS | 2200 |
| XD | 2210 |
| WD | 2220 |
| YP | 2235 |
| ZR | 2239 |
| XM | 2240 |
| BK | 2245 |
| LS | 2249 |
| XY | 2250 |
| QF | 2900 |
| ZS | 2904 |
| AY | 2905 |
| TK | 2906 |
| SZ | 2907 |
| RZ | 2908 |
| UN | 2909 |
| HR | 2911 |
| FR | 2912 |
| YO | 2914 |
| OI | 2920 |
| VA | 2921 |
| OO | 2924 |
| JX | 2925 |
| OM | 2926 |
| EJ | 2927 |
| XK | 2929 |
| ZH | 2930 |
| XI | 2950 |
| BL | 2951 |
| ZR | 3000 |
| ID | 10513 |
| TE | 10612 |
| RG | 10613 |
| JE | 10614 |
| YR | 10711 |
| PU | 10712 |
| CZ | 10713 |
| OH | 10714 |
| EB | 10715 |

| | |
|---|---|
| IL | 10720 |
| OH | 10721 |
| VI | 10808 |
| FI | 10809 |
| SO | 10810 |
| YV | 10811 |
| CJ | 10812 |
| IP | 10813 |
| MJ | 10814 |
| UQ | 10815 |
| YC | 10816 |
| FQ | 10820 |
| DG | 10821 |
| AM | 10822 |
| GB | 10908 |
| OV | 10909 |
| UC | 10910 |
| AL | 10911 |
| YU | 10912 |
| ZX | 10913 |
| UZ | 10914 |
| IL | 10915 |
| ZB | 10916 |
| RY | 10920 |
| XX | 10921 |
| NC | 10922 |
| XG | 11008 |
| VF | 11009 |
| LR | 11010 |
| NU | 11011 |
| WV | 11012 |
| ZN | 11013 |
| YD | 11014 |
| MC | 11015 |
| KL | 11016 |
| DW | 11017 |
| NC | 11018 |
| LF | 11019 |
| JX | 11020 |
| MH | 11106 |
| LX | 11107 |
| SU | 11108 |
| GQ | 11109 |
| AH | 11110 |
| JT | 11112 |
| HN | 11113 |
| JK | 11114 |
| PJ | 11116 |
| LE | 11117 |
| SD | 11118 |
| NZ | 11119 |
| UM | 11120 |
| PJ | 11121 |
| YG | 11205 |
| KK | 11206 |
| OR | 11207 |
| IX | 11208 |
| YL | 11209 |
| VP | 11210 |
| ZS | 11211 |
| IR | 11212 |
| HT | 11213 |
| IQ | 11214 |
| LT | 11215 |
| BZ | 11216 |
| CU | 11217 |
| VD | 11218 |
| CT | 11219 |
| AE | 11220 |
| GY | 11221 |
| GO | 11302 |
| JJ | 11303 |
| KE | 11304 |
| IR | 11305 |
| RV | 11306 |
| NY | 11307 |
| ON | 11308 |
| ZQ | 11309 |
| LG | 11310 |
| UV | 11312 |
| FM | 11313 |
| TX | 11314 |
| KG | 11315 |
| QP | 11316 |
| KC | 11317 |

| | |
|---|---|
| WS | 11318 |
| WN | 11319 |
| JB | 11320 |
| TF | 11321 |
| JN | 11402 |
| PI | 11403 |
| PN | 11404 |
| RK | 11405 |
| CK | 11406 |
| BK | 11407 |
| RV | 11408 |
| GD | 11409 |
| OM | 11410 |
| RW | 11413 |
| RJ | 11414 |
| DZ | 11415 |
| HN | 11416 |
| BE | 11417 |
| DE | 11418 |
| IQ | 11419 |
| CY | 11420 |
| DT | 11421 |
| TO | 11502 |
| WJ | 11503 |
| AI | 11504 |
| WA | 11505 |
| YP | 11506 |
| CL | 11507 |
| RT | 11508 |
| ZS | 11509 |
| SY | 11510 |
| JD | 11511 |
| SI | 11512 |
| QO | 11513 |
| WW | 11514 |
| UD | 11515 |
| QV | 11516 |
| HX | 11518 |
| BG | 11519 |
| MP | 11520 |
| QU | 11607 |
| LV | 11608 |
| LD | 11609 |
| KM | 11610 |
| HD | 11611 |
| LY | 11612 |
| HC | 11613 |
| JM | 11614 |
| XM | 11615 |
| RR | 11616 |
| LG | 11709 |
| KL | 11710 |
| GF | 11711 |
| TI | 11712 |
| WC | 11713 |
| QA | 11714 |
| SZ | 11715 |
| YR | 11716 |
| RH | 11809 |
| OK | 11810 |
| DN | 11811 |
| TY | 11812 |
| BS | 11813 |
| TC | 11814 |
| GZ | 11815 |
| BX | 11816 |
| DL | 11909 |
| TV | 11910 |
| XP | 11911 |
| DR | 11912 |
| ZL | 11913 |
| YL | 11914 |
| NF | 11915 |
| PR | 11916 |
| AB | 12010 |
| GK | 12012 |
| BM | 12013 |
| SR | 12014 |
| QZ | 12015 |
| NT | 12016 |
| XA | 12112 |
| DL | 12113 |
| LK | 12114 |
| ZE | 12115 |
| NV | 12116 |

## BIFFDROP

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BF | 1 | MX | 205 | KM | 355 | KD | 530 | UM | 614 | KP | 4001 | ZW | 10003 | OZ | 10043 |
| DY | 2 | PJ | 210 | KA | 360 | JN | 535 | TL | 615 | JE | 4002 | QB | 10009 | OX | 10049 |
| QK | 3 | VN | 215 | QX | 365 | TT | 550 | IR | 616 | SB | 4003 | TT | 10010 | RC | 10050 |
| XI | 5 | YG | 220 | PV | 370 | CV | 555 | JF | 618 | CO | 4004 | PE | 10011 | KV | 10051 |
| CQ | 100 | QA | 225 | IL | 400 | EH | 560 | KF | 620 | YA | 4005 | SQ | 10012 | YX | 10059 |
| VH | 105 | VZ | 230 | FC | 405 | YG | 565 | CE | 625 | YA | 4006 | NM | 10019 | HS | 10060 |
| BA | 110 | UI | 231 | CB | 410 | BW | 570 | ED | 675 | DF | 5050 | PS | 10020 | PR | 10061 |
| XR | 115 | BC | 232 | LF | 415 | QP | 575 | ZB | 680 | EX | 5055 | BE | 10021 | GB | 10062 |
| RP | 120 | FF | 233 | LF | 420 | AV | 580 | SC | 700 | VQ | 5075 | HJ | 10022 | JQ | 10063 |
| BF | 125 | RA | 234 | HY | 425 | NT | 585 | JE | 705 | XA | 5080 | LS | 10023 | CO | 10069 |
| NM | 130 | RS | 235 | FW | 430 | WW | 590 | EA | 710 | RA | 5090 | UC | 10029 | GL | 10070 |
| QH | 135 | ZR | 240 | RU | 435 | CY | 600 | YI | 800 | EY | 5091 | HZ | 10030 | LZ | 10071 |
| PH | 140 | IP | 245 | KW | 500 | DF | 605 | IA | 805 | JN | 6000 | WR | 10031 | HW | 10072 |
| GZ | 145 | KJ | 250 | CC | 505 | ER | 607 | DZ | 810 | IR | 6005 | HN | 10032 | BO | 10073 |
| MM | 150 | NZ | 255 | MH | 510 | IS | 610 | SR | 815 | MM | 9000 | AC | 10039 | DB | 10079 |
| MT | 155 | HO | 300 | BQ | 515 | ZZ | 611 | EP | 820 | DN | 10000 | EM | 10040 | MC | 19999 |
| GN | 160 | UR | 305 | UC | 520 | BZ | 612 | OC | 900 | GL | 10001 | VY | 10041 | | |
| BQ | 200 | QV | 350 | BT | 525 | PW | 613 | IV | 4000 | AB | 10002 | LV | 10042 | | |

# TECH TIPS

### REHABILITATING DISABLED [BREAK] KEY

Include this routine at the beginning of your next Autoboot BASIC program for an elegant method of selectively disabling the [BREAK] key.

When your program is booted normally, it will be safe from overly-curious or clumsy fingers. If you wish to modify the program, boot it while pressing the [SELECT] key and the [BREAK] key will be re-enabled.

Don't type the TYPO II Codes!

```
JS  1 BRK=1:IF PEEK(53279)=5 THEN BRK=0
VL  2 GOTO 10
VE  5 IF BRK THEN POKE 16,112:POKE 53774,1
    12:POKE 580,1
TA  10 REM START OF YOUR PROGRAM
LB  20 REM (USE 'GOSUB 5' TO DISABLE [BREA
    K] KEY)
```

### RAMTOP RESET

Next time you alter RAMTOP (location 106) to make room for your own machine language routines, use the line below to make sure RAMTOP is reset to its original value.

```
POKE 106,PEEK(740):GRAPHICS 0
```

**the 24 puzzle—can YOU program a solution?**

# SLIDE

Article on page 33.

## *LISTING 1*

Don't type the TYPO II Codes!

```
UC  10 REM SLIDE
IE  20 REM BY MARK MOORE
FW  30 REM (c) 1985, ANTIC PUBLISHING
AZ  40 DIM N(30)
OU  50 GRAPHICS 0:SETCOLOR 2,7,0:SETCOLOR
    4,0,2:POKE 752,1
RG  60 POSITION 17,1:? "SLIDE":POSITION 13
    ,2:? "by Mark Moore":POSITION 6,18:? "
     Please wait "
HQ  70 POSITION 2,4:POKE 82,12:?
MK  80 ? " [graphics characters]"
AT  90 ? " [graphics characters]"
VN  100 ? " [graphics characters]"
ZS  110 ? " [graphics characters]"
TP  120 ? " [graphics characters]            [graphics characters]"
LF  130 ? " [graphics characters] YOU ARE ON [graphics characters]"
CF  140 ? " [graphics characters]            [graphics characters]"
AA  150 ? " [graphics characters]"
VZ  160 ? " [graphics characters]"
AE  170 ? " [graphics characters]"
```

```
OV 180 ? " └──────────┘"
CS 190 POKE 82,2:? :C=1
TT 200 FOR V=1 TO 5:HL=5:IF V=5 THEN HL=4
WR 210 FOR H=1 TO HL
BE 220 R=INT(RND(0)*24)+1
TW 230 N(C)=R
UO 240 FOR P=0 TO C-1:IF N(P)=R THEN 220
DU 250 NEXT P:C=C+1
BZ 260 POSITION H*2+12,V*2+4:? CHR$(64+R)
MR 270 NEXT H:NEXT V
ZF 280 ? :? :? :? " Arrange in alphabetic
   al order (A-X)."
TV 290 POSITION 3,7:? "YOU CAN "
GR 300 ? "MOVE INTO"
OO 310 ? "THE BLANK"
XH 320 ? "  SPACE.":?
AA 330 ? "    NO "
JO 340 ? "DIAGONAL"
GE 350 ? " MOVES."
XQ 360 H=22:V=14:POKE 20,0:POKE 19,0:POKE
    18,0
IF 370 S=STICK(0)
XY 380 IF PEEK(764)=33 THEN 640
EZ 390 IF S=14 AND V>6 THEN V=V-2
LH 400 IF S=13 AND V<14 THEN V=V+2
KX 410 IF S=7 AND H<22 THEN H=H+2
AZ 420 IF S=11 AND H>14 THEN H=H-2
MP 430 LOCATE H,V,C
PG 440 POSITION H,V:? CHR$(C+128)
YR 450 IF S=15 THEN FOR D=1 TO 10:NEXT D
SA 460 IF S<>15 THEN FOR D=14 TO 0 STEP -
   0.5:SOUND 0,30,10,D:NEXT D:POKE 53279,
   0
BS 470 POSITION H,V:? CHR$(C):POSITION 37
   ,10:? CHR$(C)
VW 480 IF STRIG(0)=0 THEN 500
PU 490 GOTO 370
EB 500 LOCATE H,V+2,K
YD 510 IF K=160 THEN POSITION H,V+2:? CHR
   $(C):GOTO 610
FJ 520 LOCATE H,V-2,K
AR 530 IF K=160 THEN POSITION H,V-2:? CHR
   $(C):GOTO 610
HF 540 LOCATE H+2,V,K
BH 550 IF K=160 THEN POSITION H+2,V:? CHR
   $(C):GOTO 610
IJ 560 LOCATE H-2,V,K
DR 570 IF K=160 THEN POSITION H-2,V:? CHR
   $(C):GOTO 610
NK 580 LOCATE 1,1,K
NR 590 POSITION 12,21:? " ILLEGAL MOVE ":
   SOUND 0,70,12,6:FOR D=1 TO 30:NEXT D
RZ 600 SOUND 0,0,0,0:POSITION 12,21:? "-
             -":GOTO 370
TM 610 POSITION H,V:? "█"
ZS 620 FOR D=14 TO 0 STEP -1:SOUND 0,20,1
   2,D:NEXT D:POKE 77,0
PK 630 GOTO 370
NW 640 T=0:POKE 764,255:FOR V1=1 TO 5:HL=
   5:IF V1=5 THEN HL=4
IQ 650 FOR H1=1 TO HL
QG 660 T=T+1:LOCATE H1*2+12,V1*2+4,C
KN 670 POSITION H1*2+12,V1*2+4:? "▣":FOR
   D=1 TO 10:NEXT D
PG 680 POSITION H1*2+12,V1*2+4:? CHR$(C)
TV 690 IF C-64<>T THEN 760
JX 700 NEXT H1:NEXT V1
PD 710 POSITION 4,20:? " YOU DID IT!! ":?
   "TIME: "
TL 720 T=PEEK(20)+256*PEEK(19)+256*PEEK(1
   8):T=T/60
ZY 730 ? :? "          ";T;" SECONDS"
AV 740 ? :? :? :?
OG 750 END
PX 760 FOR T=1 TO 5:POSITION 3,21:? " SOR
   RY ":SOUND 0,70,12,8
QH 770 FOR D=1 TO 10:NEXT D:SOUND 0,0,0,0
   :POSITION 3,21:? "          "
TZ 780 FOR D=1 TO 10:NEXT D:NEXT T
NX 790 LOCATE 1,1,K:GOTO 370
```

how many notes do YOU bid?

# GUESS THAT SONG

Article on page 24.

## LISTING 1

Don't type the TYPO II Codes!

```
EI 10 REM GUESS THAT SONG!
BX 20 REM BY KARL E. WIEGERS
FW 30 REM (c) 1985, ANTIC PUBLISHING
ZR 50 DIM PLYR1$(8),PLYR2$(8),NAME$(40),C
   AT$(44),DONE$(40),P$(11),D$(11),BID$(2
   ),BL$(38),WHO$(8),S(2)
DT 60 NAME$=" ":NAME$(40)=NAME$:NAME$(2)=
   NAME$:DONE$=NAME$:BL$=NAME$(3)
FZ 70 CAT$="  rock        classical theme s
   ongs  general  "
RI 80 S(1)=0:S(2)=0:LAST=2:OLDBID=11
AH 90 GOSUB 1000:REM GET PLAYER NAMES
NM 110 GOSUB 1500:REM GET CATEGORY
FZ 120 GOSUB 2000:REM DO BIDDING
UC 130 GOSUB 2200:REM PLAY SONG
KR 140 GOSUB 2800:REM JUDGE ANSWER
CN 150 GOSUB 3500:REM SEE IF THERE'S A WI
   NNER YET
TN 160 IF A=78 OR A=110 THEN END
CE 170 IF A=89 OR A=121 THEN 60
SN 180 FOR I=1 TO 40:IF DONE$(I,I)=" " TH
   EN 110
GJ 190 NEXT I
XU 200 GRAPHICS 17:? #6;"SORRY, OUT OF SO
   NGS"
KU 210 ? #6:? #6;"  PRESS ANY KEY TO":? #
   6;"       PLAY AGAIN"
QE 220 GOSUB 900:GOTO 60
UP 800 FOR I=1 TO 15:SOUND 0,96,10,10:NEX
   T I
VX 810 FOR I=1 TO 15:SOUND 0,128,10,10:NE
   XT I
RI 820 SOUND 0,0,0,0:RETURN
XD 900 OPEN #1,4,0,"K:":GET #1,A:CLOSE #1
   :RETURN
ZN 1000 GRAPHICS 18:TRAP 1000:POKE 65,0
VW 1010 POSITION 2,0:? #6;"GUESS that SON
   G!"
```

continued on next page

```
JH 1020 POSITION 1,4:? #6;"WHO IS PLAYER 1?"
ZH 1030 POSITION 5,5:? #6;"?":Y=5:GOSUB 1100
SB 1040 PLYR1$=NAME$(1,I-1)
NT 1050 POSITION 1,8:? #6;"WHO IS PLAYER 2?"
GW 1060 POSITION 5,9:? #6;"?":Y=9:GOSUB 1100
SU 1070 PLYR2$=NAME$(1,I-1)
UV 1080 TRAP 40000:RETURN
EP 1100 OPEN #1,4,0,"K:"
GR 1110 FOR I=1 TO 14:GET #1,A
NG 1120 IF A=155 THEN 1150
WP 1130 POSITION I+5,Y:PUT #6,A
HK 1140 NAME$(I,I)=CHR$(A):NEXT I
DS 1150 CLOSE #1:RETURN
HO 1500 GRAPHICS 0:POKE 752,1:POKE 708,88:POKE 710,18
UM 1510 DL=PEEK(560)+256*PEEK(561)
BB 1520 POKE DL+3,70:FOR I=6 TO 10:POKE DL+I,6:NEXT I
NP 1530 POSITION 1,0:? #6;PLYR1$:POSITION 11,0:? #6;PLYR2$
YU 1540 POSITION 3,1:? #6;S(1):POSITION 13,1:? #6;S(2)
MM 1550 SONG=INT(100*RND(0)):IF SONG<1 OR SONG>40 THEN 1550
YA 1560 IF DONE$(SONG,SONG)="1" THEN 1550
XQ 1570 CA=INT((SONG+9)/10):LN=3990+SONG*10
BG 1580 POSITION 20,2:? #6;"CATEGORY:";CAT$(11*CA-10,11*CA)
BK 1590 RETURN
JB 2000 OLDBID=11
KZ 2005 TRAP 40000:IF LAST=1 THEN WHO$=PLYR2$
QG 2010 IF LAST=2 THEN WHO$=PLYR1$
QM 2020 POSITION 2,6:? WHO$;", you can guess that song in":? "how many notes..."
YQ 2030 POSITION 20,7:INPUT BID$
UV 2035 IF BID$="0" THEN OB=2:GOTO 2071
GI 2036 IF BID$<>"1" THEN 2040
TA 2037 IF LAST=2 THEN LAST=1:GOTO 2039
SN 2038 IF LAST=1 THEN LAST=2
AL 2039 BID$="P":OLDBID=1:POSITION 10,4:? "CURRENT BID = ";OLDBID;" "
EJ 2040 IF BID$="P" OR BID$="p" THEN 2110
KL 2050 TRAP 2070:NUBID=VAL(BID$)
FH 2060 IF NUBID<OLDBID AND NUBID>0 THEN 2090
JF 2070 OB=OLDBID
QB 2071 GOSUB 800:? :? "MUST BE FROM 1 TO ";OB-1;", OR P TO PASS":FOR TIM=1 TO 500:NEXT TIM
MK 2075 ? "↑Please try again.           ":FOR TIM=1 TO 500:NEXT TIM
WJ 2077 ? "↑                              "
OA 2080 POSITION 20,7:? "      ":GOTO 2030
MB 2090 OLDBID=NUBID:LAST=1+(LAST=1):POSITION 10,4:? "CURRENT BID = ";OLDBID;" "
QC 2100 POSITION 1,6:? BL$:? BL$:? BL$:? BL$:GOTO 2005
WP 2110 IF OLDBID=11 THEN OLDBID=10
AI 2120 RETURN
PI 2200 POSITION 1,6:? BL$:? BL$:? BL$:? BL$
PW 2210 IF LAST=1 THEN WHO$=PLYR1$
RR 2220 IF LAST=2 THEN WHO$=PLYR2$
CE 2230 POSITION 2,6:? "Okay, ";WHO$;", here are your ";OLDBID;" notes."
GR 2240 ? "For ";11-OLDBID;" point";:IF OLDBID<10 THEN ? "s";
KS 2245 ? ",  GUESS THAT SONG!!"
WZ 2250 FOR I=1 TO 300:NEXT I
AF 2260 GOSUB 2500
OU 2270 POSITION 2,10:? "Press A for answer, R to play again"
ZM 2280 GOSUB 900
YN 2290 IF A=82 OR A=114 THEN 2260
LA 2300 IF A<>65 AND A<>97 THEN GOSUB 800:GOTO 2280
AJ 2310 RETURN
NJ 2500 RESTORE LN:READ TEMPO,PAUSE,P$,D$,NAME$
ZE 2510 FOR I=1 TO OLDBID
UW 2520 FOR J=1 TO TEMPO*(ASC(D$(I,I))-64)
IK 2530 SOUND 0,ASC(P$(I,I)),10,8:NEXT J
GB 2540 FOR J=1 TO PAUSE:SOUND 0,0,0,0:NEXT J
NF 2550 NEXT I:SOUND 0,0,0,0:RETURN
RL 2800 POSITION 2,10:? "The title of this song is:           ":? :? NAME$
UH 2810 POSITION 2,15:? "Did ";WHO$;" get the title correct?"
ZG 2820 GOSUB 900
YH 2830 IF A=78 OR A=110 THEN 2900
PL 2840 IF A<>89 AND A<>121 THEN GOSUB 800:? :? "  PRESS Y FOR YES OR N FOR NO":GOTO 2820
NX 2850 FOR I=1 TO 11-OLDBID:S(LAST)=S(LAST)+1:POSITION 3+(LAST=2)*10,1:? #6;S(LAST);" "
MD 2860 GOSUB 3100:NEXT I
OX 2870 DONE$(SONG,SONG)="1"
YR 2880 POSITION 2,15:? "Here are the first ten notes....         ":OLDBID=10:GOSUB 2500
PC 2890 GOTO 3000
UW 2900 FOR I=1 TO OLDBID:S(LAST)=S(LAST)-1:POSITION 3+(LAST=2)*10,1:? #6;S(LAST);" "
QT 2910 POKE 53279,1:FOR J=1 TO 20:NEXT J:NEXT I
BT 3000 POSITION 7,20:? " PRESS ANY KEY TO CONTINUE "
JY 3010 GOSUB 900:RETURN
DO 3100 FOR J=8 TO 0 STEP -1:SOUND 0,53,10,J:FOR K=1 TO 4:NEXT K:NEXT J:RETURN
AZ 3500 IF S(1)>=50 THEN WHO$=PLYR1$:GOTO 3530
CT 3510 IF S(2)>=50 THEN WHO$=PLYR2$:GOTO 3530
KU 3520 A=0:RETURN
KP 3530 GRAPHICS 18
DK 3540 POSITION 3,4:? #6;WHO$;" WINS!!"
MB 3550 FOR I=40 TO 230:POKE 708,I:NEXT I
CS 3560 LN=5000:OLDBID=11:GOSUB 2500
FE 3570 POSITION 4,8:? #6;"PLAY AGAIN?"
VE 3580 GOSUB 900:IF A=78 OR A=89 OR A=110 OR A=121 THEN RETURN
TF 3600 POSITION 4,10:? #6;"PRESS Y OR N":GOTO 3580
RJ 3999 REM SONG DATA
HR 4000 DATA 15,8,11y1 YGY,AAABBBBABA,"Sunshine of Your Love"
WA 4010 DATA 10,4, y 6 ,BAHABAIBAB,"Yellow Submarine"
HT 4020 DATA 16,4, 66 r1♦[♦,AAHAAAAAAB,"Yesterday"
DX 4030 DATA 6,5,y1f[fly y ,CCOCCCBBPC,"The Age of Aquarius"
VD 4040 DATA 16,3,♦♦eeeUQU♦e,DBACBCABHB,"Scarborough Fair"
BG 4050 DATA 13,4,♦U♦1♦♦U♦1 ,AAAALAAACL,"California Dreaming"
XC 4060 DATA 4,6, <eH HQH,BFFCHBFFCH,"Happy Together"
TK 4070 DATA 25,4, y♦He♦ye<Q,AAAAAAAAAA,"Stairway to Heaven"
OH 4080 DATA 12,6, ffrf[yyf,CCFBABAHAB,"Close to You"
VE 4090 DATA 20,5, y y[QHH,AABBBACAAA,"Ebony and Ivory"
PN 4100 DATA 28,3, yf yf yf ,AAAAAAAAAA,"Moonlight Sonata"
MI 4110 DATA 21,4, y[ly[1 ,BBBAABAABB,"Pictures at an Exhibition"
SV 4120 DATA 12,4,<e<5<eH<<H,LAAAAAABAA,"Ravel's Bolero"
XJ 4130 DATA 20,7,Y HHUUY,AAAABABABA,"The Blue Danube"
PR 4140 DATA 6,5, 666Y ,CCCMCCCLBB,"Beethoven's Fifth Symphony"
IJ 4150 DATA 20,3, y y y[♦,AADAADAABC,"
```

```
   Brahms' Lullaby"
XK 4160 DATA 23,4,◆y1◆Q[[HQQ,AAAAAAAAAA,
   "Jesu Joy of Man's Desiring" (Bach)
XT 4170 DATA 20,3,◆U◆1r1■■r1,ABABAACAAB,"
   Carnival of Venice"
DY 4180 DATA 4,8,1111◆◆U1◆1,FAAAFFFFME,Ma
   rche Miniature from "The Nutcracker"
YT 4190 DATA 15,8,■■◤y1◤1r■r,AAAAAABAAB,"
   In the Hall of the Mountain King"
EC 4200 DATA 28,3,■yf1yfy1y▌,AAAAAAAAAA,"
   The Godfather"
XC 4210 DATA 5,4,■■y1◆yyy1◆,DBDBGDZDBD,"A
   ll in the Family"
YH 4220 DATA 15,4,■◆r■■◆■■■H,BCAJBCAJBC,"
   Tara's Theme" (Gone With the Wind)
ZM 4230 DATA 15,5,[f1f1f1y1y,BBACBBAGAA,"
   MASH" ("Suicide is Painless")
CD 4240 DATA 8,5,■■◆1r■H◆1r,DGGAAAGDAA,"S
   tar Wars"
WT 4250 DATA 14,4,QHQ[◆1y■■■,BBAAFAABBD,"
   The Sound of Music"
ZR 4260 DATA 12,4,■ ■[■[■[[Q,AAABABAFAA,"
   The Sting"
MG 4270 DATA 6,20,■■◤y■■■■■■,CCBBCCBBCC,"
   Mission Impossible"
NX 4280 DATA 10,5,■■1r■■■◆◆L,CAFBAAAFAJ,"
   Star Trek"
FD 4290 DATA 10,5,D[f1y◤y[[◆,MAAAAABBAA,"
   Oklahoma!"
ZQ 4300 DATA 10,7,◆◆◆[◆1y◆◆Q,CBABABAKAB,"
   Raindrops Keep Falling on My Head"
VS 4310 DATA 9,5,■■■■■y◆1y■,BACCCFBACC,"T
   he Star-Spangled Banner"
BI 4320 DATA 14,3,1[QHeHQ◆y1,BDBCABDBCA,"
   Greensleeves"
NG 4330 DATA 10,5,■■ ▌■■■■■■,DCAAGABAAB,"
   Beer Barrel Polka"
BT 4340 DATA 11,5,1Q1■■◆1■1■,BBBBCAAABI,"
   How Much is That Doggy in the Window?"

YR 4350 DATA 30,3,■■■y■■■■■■,AAAEAAABCA,"
   Autumn Leaves"
YL 4360 DATA 30,4,■◆1r◤■U ▌LU,AAAAAABAAA,"
   When You Wish Upon A Star"
DU 4370 DATA 21,4,■y1fQ■1■ ■,AAAAAFBFBH,"
   The Shadow of Your Smile"
HF 4380 DATA 13,4,■■y1■1[Qy[,DBBCADDBBH,"
   Anchors Aweigh"
MG 4390 DATA 3,8,y1◆[y■■■■1,BBBGGGDBDB,"S
   eventy-Six Trombones"
KG 5000 DATA 6,4,1r1■1◆[UQLH,DCABDBBBBD,
   WINNER
```

# FONTMAKER

See Help.

## LISTING 1

Don't type the TYPO II Codes!

```
XW 10 REM GEMINI 10X FONT MAKER
KB 15 REM SG-10 MODIFICATION BY CHARLES J
   ACKSON
FV 20 REM (c) 1985, ANTIC PUBLISHING
JD 1700 D=PEEK(CHORG+10*(C-32)):B$(18,18)
   =CHR$(7):IF D=0 THEN B$(18,18)=CHR$(8)
VS 1702 FOR I=1 TO 9:TMP=USR(ADR(B$),(PEE
   K(CHORG+10*(C-32)+I))):T(I)=TMP:NEXT I
ZT 1720 PRINT #4;E$;CHR$(42);CHR$(1);CHR$
   (C);CHR$(C);CHR$(9+128*(D=0));
OU 1730 PRINT #4;"♥";CHR$(T(1));CHR$(T(2)
   );CHR$(T(3));CHR$(T(4));
PG 1735 PRINT #4;CHR$(T(5));CHR$(T(6));CH
   R$(T(7));CHR$(T(8));CHR$(T(9));"♥";
EF 2315 DIM B$(27):B$="hhh■■)♥■♥◣┴F■i♥■■◢
   ■■■■■■♥■■■◆"
IY 2590 POSITION 11,0:? "SG-10 FONT MAKER
   ":POSITION 15,1:? "by James Duffin"
SI 2710 ? :? "The SG-10 Font Maker":? "
             by JAMES DUFFIN":? "    is a
    program which allows you to"
```

# CRYPTOQUOTES

Article on page 21.

## LISTING 1

Don't type the TYPO II Codes!

```
ZG 10 REM CRYPTO QUOTES
CH 20 REM BY MIKE FLEISCHMANN
FW 30 REM (c) 1985, ANTIC PUBLISHING
ML 90 DIM A$(320),B$(320),CH1$(3),CH2$(1)
   ,ALPH$(26),C$(320)
RL 100 GRAPHICS 0:? ," CRYPTO QUOTES ":?
FK 105 ? "INPUT YOUR STRING:"
ZJ 110 INPUT A$
IS 140 REM If your string is too long for
    A$, continue it in B$, below.
FE 160 ? :? "INPUT THE REST OF YOUR STRIN
   G":? " or press [RETURN]."
WL 170 INPUT B$:IF LEN(B$)<1 THEN C$=A$:G
   OTO 190
FT 180 C$(1,LEN(A$))=A$:C$(LEN(A$)+1,LEN(
   A$)+1)=" ":C$(LEN(A$)+2)=B$:A$=C$
YH 190 FOR I=1 TO LEN(C$):KK=ASC(C$(I,I))
   :IF KK=32 THEN 210
GM 200 IF KK<65 OR KK>90 THEN POP :POSITI
   ON 7,10:? "K UPPER CASE LETTERS ONLY!"
   ::FOR KK=1 TO 300:NEXT KK:GOTO 10
FU 210 NEXT I
```

continued on next page

```
HS 220 FOR I=1 TO LEN(C$):C$(I,I)=CHR$(AS
   C(C$(I,I))+128):NEXT I
ZM 230 FOR I=1 TO 320:B$(I)=" ":NEXT I
QS 240 GRAPHICS 0:? ," CRYPTO QUOTES ":GO
   SUB 10090:REM FIGURE OUT STRING BREAK
   POSITIONS
DF 250 ALPH$="ABCDEFGHIJKLMNOPQRSTUVWXYZ"

HB 260 GOSUB 1050:REM PRINT CRYPTO STRING

DP 270 GOSUB 2050:REM PRINT REPLACEMENT S
   TRING
DZ 280 POSITION 6,10:? ALPH$:? :? "  Type
    in the letter you want to "
PP 290 ? " change and then the letter you
    "
EC 300 ? " think it should be."
NX 305 ? :? "(For example, typing  W S  c
   hanges all W's to S's.)"
QU 310 ? :? " IF W= # GUESSES WILL BE ERA
   SED"
FW 320 ? " IF W= @ START OVER"
WO 330 ? " IF W= % END PROGRAM":PRINT "
                    ":POSITION 3,22
ZF 340 INPUT CH1$:IF LEN(CH1$)<1 THEN 240

ZC 341 FOR X=1 TO LEN(CH1$):KK=ASC(CH1$(X
   ,X))
VD 342 IF (KK>64 AND KK<91) THEN 348
HE 343 IF KK=32 OR KK=35 OR KK=37 OR KK=6
   4 THEN 348
PH 344 POP :POSITION 7,6:? " UPPERCASE L
   ETTERS ONLY ";:FOR KK=1 TO 150:NEXT KK

ON 347 GOTO 240
MT 348 NEXT X
NA 350 IF CH1$="#" THEN 230
XS 360 IF CH1$="@" THEN A$="":GOTO 100
PB 370 IF CH1$="%" THEN 420
TX 380 IF LEN(CH1$)<3 THEN CH2$=" ":CH1$=
   CH1$(1,1):GOTO 400
KI 390 CH2$=CH1$(3,3):CH1$=CH1$(1,1)
UH 400 GOSUB 3060
OU 410 GOTO 270
KN 420 GRAPHICS 0:END
BA 1050 POSITION 1,2:FOR I=1 TO BPT1:PRIN
   T C$(I,I);:NEXT I
KI 1060 IF BPT2=0 THEN RETURN
JU 1070 POSITION 1,4:FOR I=BPT1+1 TO BPT2
   :PRINT C$(I,I);:NEXT I
LA 1080 IF BPT3=0 THEN RETURN
NW 1090 POSITION 1,6:FOR I=BPT2+1 TO BPT3
   :PRINT C$(I,I);:NEXT I
KQ 1100 IF BPT4=0 THEN RETURN
QW 1110 POSITION 1,8:FOR I=BPT3+1 TO BPT4
   :PRINT C$(I,I);:NEXT I
AH 1120 RETURN
YV 2050 POSITION 1,1:FOR I=1 TO BPT1:PRIN
   T B$(I,I);:NEXT I
KJ 2060 IF BPT2=0 THEN RETURN
HK 2070 POSITION 1,3:FOR I=BPT1+1 TO BPT2
   :PRINT B$(I,I);:NEXT I
LB 2080 IF BPT3=0 THEN RETURN
LM 2090 POSITION 1,5:FOR I=BPT2+1 TO BPT3
   :PRINT B$(I,I);:NEXT I
KR 2100 IF BPT4=0 THEN RETURN
OM 2110 POSITION 1,7:FOR I=BPT3+1 TO BPT4
   :PRINT B$(I,I);:NEXT I
CW 2120 PRINT " "
AL 2130 RETURN
MX 3020 REM SEARCH CRYPTO AND PUT GUESS I
   N REPLACEMENT STRING, UPDATE ALPHA$
SX 3060 FOR I=1 TO LEN(A$):IF CH1$=A$(I,I
   ) THEN B$(I,I)=CH2$
FM 3070 NEXT I
BN 3080 ALPH$="ABCDEFGHIJKLMNOPQRSTUVWXYZ
   "
CS 3090 FOR I=1 TO LEN(A$):CH1$=B$(I,I):I
   F CH1$<>" " THEN T=ASC(CH1$)-ASC("A")+
   1:ALPH$(T,T)=" "
ET 3100 NEXT I
AG 3110 RETURN
MR 10090 BPT1=0:BPT2=0:BPT3=0:BPT4=0:REM
   BPTn IS THE BREAK POINT FOR EACH LINE
RC 10100 IF LEN(A$)<38 THEN BPT1=LEN(A$):
   RETURN :REM CHECK FOR A$ LESS THAN 1 L
   INE LONG
OI 10110 FOR I=38 TO 20 STEP -1:IF A$(I,I
   )=" " THEN 10130
FU 10120 NEXT I
DN 10130 BPT1=I
WO 10140 IF LEN(A$)<BPT1+38 THEN BPT2=LEN
   (A$):RETURN
OS 10150 FOR I=BPT1+38 TO BPT1+20 STEP -1
   :IF A$(I,I)=" " THEN 10170
GK 10160 NEXT I
EN 10170 BPT2=I
ZH 10180 IF LEN(A$)<BPT2+38 THEN BPT3=LEN
   (A$):RETURN
EV 10190 FOR I=BPT2+38 TO BPT2+20 STEP -1
   :IF A$(I,I)=" " THEN 10210
FP 10200 NEXT I
EC 10210 BPT3=I
AP 10220 IF LEN(A$)<BPT3+38 THEN BPT4=LEN
   (A$):RETURN
PJ 10230 FOR I=BPT3+38 TO BPT3+20 STEP -1
   :IF A$(I,I)=" " THEN 10250
GF 10240 NEXT I
FC 10250 BPT4=I
EB 10260 RETURN
```

**bonus game**

# DARKSTAR

Article on page 31.

## *LISTING 1*

```
; DARKSTAR, LISTING 1
; BY MICHAEL MITCHELL
; (c) 1985, ANTIC PUBLISHING

BYTE WSYNC=54282,VCOUNT=54283,
     CLR=53274,CTR,CLR1=53270,
     CHGCLR=[0],INCCLR1,S,INCCLR,
     CLR2=53271,A,B
CARD ML,SC,SP,Q,I

PROC WAIT(CARD N); MAIN DELAY
 FOR I=0 TO N+N
 DO OD
RETURN

PROC TITLE()    ; PRINT TITLE AND
SC=0  ML=0      ; SCROLL THE COLORS
GRAPHICS(2+16)
POSITION(5,2)
 PRINTDE(6,"dArKsTaR")
POSITION(8,4)
 PRINTDE(6,"By")
```

```
POSITION(1,6)
 PRINTDE(6," MichAeL MItChElL")
POSITION(0,09)
 PRINTDE(6,"PrEsS FiRe To BeGiN!")
DO
 FOR CTR=1 TO 10
 DO
  INCCLR=CHGCLR INCCLR1=CHGCLR
  DO
   S=STRIG(0)
   IF S=0 THEN RETURN FI
   WSYNC=0
   CLR=INCCLR CLR1=INCCLR1
   CLR2=INCCLR+10

   INCCLR==+1 INCCLR1==-1
   UNTIL VCOUNT&128
  OD
 OD
 CHGCLR==+1
OD

PROC BOX()   ; DRAWS THE ENEMY
A=RAND(150)+3  B=RAND(74)+3 COLOR=1
PLOT(A,B)
DRAWTO(A+2,B) DRAWTO(A+2,B+2)
DRAWTO(A,B+2) DRAWTO(A,B)
RETURN

PROC MAIN() ;  THE MAIN ROUTINE
INT XX=[1],YY=[0],SS,X,Y,Q
BYTE Z,E,E1,A1,B1,D,C=[0]
BYTE A,B
X=50 Y=50

GRAPHICS(7) COLOR=2 ; DRAW BORDER
SNDRST()
PLOT(1,1)
DRAWTO(158,1) DRAWTO(158,79)
DRAWTO(1,79) DRAWTO(1,1)
BOX()
        ; LOOK FOR COLLISION
DO
 Z=LOCATE(X,Y)
 IF Z=1 THEN     ; ENEMY HAS BEEN HIT
  FOR E=1 TO 20
  DO WAIT(50) SOUND(0,E,08,10)
  SETCOLOR(2,E,10)
  OD
  SNDRST() BOX()
  SC==+10 SETCOLOR(2,0,0)
 FI
 IF Z=2 THEN     ; YOU HAVE BEEN HIT
  FOR D=1 TO 35
  DO COLOR=C
  SOUND(0,D,8,10) C==+1
  SETCOLOR(2,D,C) SETCOLOR(0,C,D)
  SETCOLOR(1,A1,B1)
  IF C=4 THEN C=1 FI
  A1=RAND(153) B1=RAND(78) PLOT(X,Y)
  DRAWTO(A1,B1)
 OD
 ML==+1  SNDRST()
  IF ML>2 THEN  ; CHECK FOR MEN LEFT
   ML=0 GRAPHICS(2+16)
   POSITION(4,4)
   PRINTD(6,"GAME OVER")
   POSITION(4,5)
   PRINTD(6,"SCORE: ") PRINTBDE(6,SC)
   FOR X=0 TO 242 STEP 2
   DO
    WAIT(500) SOUND(0,X+1,10,10)
    SOUND(1,X+2,10,10)
    SOUND(2,X+3,10,10)
    SOUND(3,X+4,10,10)
    SETCOLOR(0,X,10)
   OD
   WAIT(32000)    ; DELAY
   SC=0 TITLE()
   FI
  MAIN()
 FI

 Q==+1 SETCOLOR(1,Q,14)
 COLOR=2 PLOT(X,Y)
 SS=STICK(0)    ; READ THE JOYSTICK
  IF SS=14 THEN XX=0  YY=-1
  ELSEIF SS=13 THEN XX=0 YY=1
  ELSEIF SS=11 THEN XX=-1 YY=0
  ELSEIF SS=7 THEN XX=1 YY=0
  FI
 WAIT(350)   ; CHANGE WAIT VALUE FOR
             ; FASTER OR SLOWER SPEEDS
 X==+XX Y==+YY
 POKE(53279,5) ; KEYBOARD SOUND
OD
RETURN

PROC START()
 TITLE()
 MAIN()
```

## LISTING 2

Don't type the TYPO II Codes!

```
JP 10 REM DARKSTAR, LISTING 2
SU 20 REM BY MICHAEL MITCHELL
FW 30 REM (c) 1985, ANTIC PUBLISHING
AH 40 GRAPHICS 17:SOUND 0,191,10,15:SOUND
    2,190,10,15:SH=2:SS=STICK(0)
KP 50 POSITION 5,5:? #6;"DARK STAR":POSIT
   ION 2,10:? #6;"by Mike Mitchell":POSIT
   ION 1,16:? #6;"PRESS FIRE to begin"
GA 60 X=X+1:SETCOLOR 0,X,10:SETCOLOR 1,X+
   3,10:SETCOLOR 2,X+5,10:SETCOLOR 3,X+7,
   10:IF STRIG(0)=0 THEN 80
SY 70 GOTO 50
SS 80 POKE 559,0:POKE 53768,133:FOR S=1 T
   O 2500:NEXT S:GRAPHICS 23:POKE 559,0:S
   OUND 0,0,0,0:SOUND 2,0,0,0
RN 90 COLOR 3:XX=1:YY=0:X=50:Y=50:PLOT 2,
   2:DRAWTO 159,2:DRAWTO 159,79:DRAWTO 2,
   79:DRAWTO 2,2:POKE 559,34
XV 100 SETCOLOR 0,10,15:SETCOLOR 2,5,7:SC
   =SC+10
QK 110 A=RND(0)*152+3:B=RND(50)*70+5:COLO
   R 1:PLOT A,B:DRAWTO A+2,B
MA 120 POKE 77,0:DRAWTO A+2,B+2:DRAWTO A,
   B+2:DRAWTO A,B
ID 130 LOCATE X,Y,Z:IF Z=3 THEN 210
DR 140 COLOR 3:PLOT X,Y:POKE 53279,5:SS=S
   TICK(0):IF SS=14 THEN XX=0:YY=-1
TX 150 IF Z=1 THEN FOR B=10 TO 1 STEP -1:
   SETCOLOR 4,B,B:SOUND 0,10,8,B:NEXT B:X
   =X+XX:Y=Y+YY:SETCOLOR 4,0,0:GOTO 100
MN 160 IF SS=13 THEN XX=0:YY=1
MS 170 IF SS=11 THEN XX=-1:YY=0
FC 180 IF SS=7 THEN XX=1:YY=0
EW 190 X=X+XX:Y=Y+YY:GOTO 130
PG 200 REM EXPLOSION SUBROUTINE
DT 210 S=PEEK(560)+256*PEEK(561)+5:L=0:H=
   0:FOR LL=70 TO 0 STEP -1.3:L=L+60:IF L
   >255 THEN L=L-256:SOUND 0,LL,8,13
LM 220 SOUND 1,LL+5,8,14:SOUND 2,LL+10,8,
   12
HB 230 POKE S,L:POKE S+1,H:NEXT LL:SH=SH-
   1:IF SH<0 THEN GOSUB 300:GRAPHICS 18:G
   OTO 250
GU 240 GOSUB 300:GRAPHICS 7+16:GOTO 90
KL 250 SOUND 0,191,10,15:SOUND 2,190,10,1
   5
YY 260 POSITION 5,3:? #6;"GAME OVER":POSI
```

continued on next page

```
   TION 5,5:? #6;"SCORE ";SC:X=X+1
ST 270 SETCOLOR 0,X,X:IF X>350 THEN GOSUB
   300:GOTO 40
AO 280 IF STRIG(0)=0 THEN GOTO 80
MY 290 SH=2:GOTO 260
VT 300 FOR D=0 TO 3:SOUND D,0,0,0:NEXT D:
   RETURN
```

**bonus game**

# OVERFLOW

Article on page 39.

## LISTING 1

Don't type the TYPO II Codes!

```
BX 10 REM OVERFLOW
FU 20 REM BY ANSCHUETZ/WEISGERBER/ANSCHUE
   TZ
FW 30 REM (c) 1985, ANTIC PUBLISHING
RC 40 TUNL=50:WATR=148:MT=0
CQ 50 POKE 106,PEEK(740)
HP 60 MEM=PEEK(106):DL=(MEM-5)*256:CH=(ME
   M-4)*256:JW=MEM-12:EA=MEM-11:RA=(MEM-9
   )*256:S=(MEM-7)*256
MA 70 GRAPHICS 2:POKE 709,50:DIM Q(10),A$
   (46),B$(16):POKE 755,0:POSITION 6,4:?
   #6;"OVERFLOW"
DU 80 POKE 710,30:POKE 712,30:? :? "     A
   nschuetz/Weisgerber/Anschuetz":GOTO 41
   0
NM 90 POKE 709,TUNL:POKE 710,WATR:POKE 71
   2,0:POKE 707,TUNL
DW 100 POKE 89,JW:POKE 756,MEM-4:POKE 559
   ,62:POKE 560,0:POKE 561,MEM-5:POKE 532
   51,120:POKE 53248,123
RN 110 ? :? :? :? :FOR X=1 TO 10:Q(X)=INT
   (RND(0)*2)*2-1:NEXT X:SC=0:POKE 656,0:
   POKE 657,16:? "OVERFLOW"
OM 120 POKE 657,4:? "SCORE:0     ";:POKE 6
   57,26:? "HIGH:";HC;:YX=33:POKE 88,YX:P
   OSITION 0,0:? #6;A$(17,30)
XN 130 QL=DL+1:C=0:FOR X=DL+4 TO DL+31 ST
   EP 3:Y=INT(RND(0)*11)+101:Y=Y+(Y/2<>IN
   T(Y/2)):POKE X,Y:NEXT X
SF 140 C=C+1:QL=QL+3:POKE QL,PEEK(QL)+Q(C
   )
UZ 150 POKE 53278,0:IF QL>DL+28 THEN QL=D
   L+1:C=0
FJ 160 ST=STICK(0):IF ST=14 THEN YX=YX-16
   *(YX>33):POKE 88,YX:POSITION 0,0:? #6;
   A$(17,46)
VO 170 POKE 709,TUNL:POKE 710,WATR
LT 180 IF ST=13 THEN YX=YX+16*(YX<177):PO
   KE 88,YX-16:POSITION 0,0:? #6;A$(1,30)

CY 190 IF ST=7 AND J=0 THEN PLX=133:PLY=Y
   X+3:J=4:POKE 89,EA:POKE 88,YX+3:POSITI
   ON 0,0:? #6;B$(1,8):POKE 89,JW
DU 200 IF ST=11 AND J=0 THEN PLX=115:PLY=
   YX+3:J=-4:POKE 89,EA:POKE 88,YX+3:POSI
   TION 0,0:? #6;B$(9,16):POKE 89,JW
NW 210 IF PEEK(53255)>3 THEN POKE 707,WAT
   R:GOTO 360
OO 220 IF J<>0 THEN 240
NF 230 GOTO 140
CD 240 IF PEEK(53253)>3 THEN 270
WO 250 POKE 53249,PLX:PLX=PLX+J
DT 260 IF PEEK(53253)<4 THEN 290
VT 270 HQ=(PLY-20)/16:IF SGN(Q(HQ))<>SGN(
   J) THEN 330
HH 280 SOUND 0,100,10,10:SC=SC+10:Q(HQ)=-
   Q(HQ):POKE 657,10:? SC;:GOTO 310
RC 290 IF PLX>200 OR PLX<48 THEN 330
NA 300 GOTO 140
KY 310 POKE 77,0:IF SC=250 THEN SOUND 0,6
   0,10,12:GOTO 350
FN 320 IF SC=500 THEN SOUND 0,60,10,12:PO
   KE 53259,3:POKE 53251,112:FOR X=1 TO 1
   00:NEXT X
UU 330 POKE 53249,0:J=0:POKE 89,EA:POKE 8
   8,PLY:POSITION 0,0:? #6;A$(1,8):POKE 8
   9,JW:POKE 53278,0
MW 340 SOUND 0,0,0,0:GOTO 140
SP 350 FOR X=1 TO 10:Q(X)=Q(X)*2:NEXT X:F
   OR X=DL+4 TO DL+31 STEP 3:Y=PEEK(X):PO
   KE X,Y+(Y/2=INT(Y/2)):NEXT X:GOTO 330
DQ 360 J=0:POKE 656,3:POKE 657,9:? "PRESS
    <START> TO BEGIN";:IF SC>HC THEN HC=S
   C
MP 370 YC=YC+(YC<255)-255*(YC=255):POKE 7
   04,YC:IF PEEK(53279)<>6 THEN 370
FY 380 FOR X=DL+4 TO DL+31 STEP 3:POKE X,
   108:NEXT X:POKE 89,EA:POKE 88,PLY:POSI
   TION 0,0:? #6;A$(1,8):POKE 53251,120
YD 390 POKE 704,198
LT 400 POKE 89,JW:POKE 88,YX:POSITION 0,0
   :? #6;"                    ":POKE 707,TUNL:
   POKE 53249,0:POKE 53259,1:GOTO 110
TN 410 FOR X=0 TO 511:POKE X+CH,PEEK(X+57
   344):NEXT X:FOR X=8 TO 23:READ A:POKE
   X+CH,A:NEXT X
SX 420 FOR X=DL TO DL+2:POKE X,112:NEXT X
   :FOR X=DL+3 TO DL+30 STEP 3:POKE X,69:
   POKE X+1,108:POKE X+2,S/256:NEXT X
EE 430 POKE DL+33,66:POKE DL+34,PEEK(660)
   :POKE DL+35,PEEK(661):FOR X=DL+36 TO D
   L+38:POKE X,2:NEXT X:POKE DL+39,65
QO 440 FOR X=RA+32 TO RA+191:POKE X,255:N
   EXT X:FOR X=JW*256 TO RA:POKE X,0:NEXT
    X:FOR X=1 TO 46:A$(X,X)=" ":NEXT X
HV 450 FOR X=17 TO 30:READ A:A$(X)=CHR$(A
   +32):NEXT X:A$(46,46)=" ":FOR X=1 TO 1
   6:READ A:B$(X)=CHR$(A):NEXT X
VF 460 POKE 623,1:POKE 54279,MEM-16:POKE
   53277,3:POKE 704,198:POKE 705,198:POKE
    707,TUNL:POKE 53259,1
NU 470 FOR X=S TO S+108:POKE X,2:POKE X+1
   47,2:NEXT X:FOR X=S+109 TO S+146:POKE
   X,1:NEXT X:SOUND 1,160,8,2:GOTO 90
KY 480 DATA 84,170,170,170,170,170,170,69
   ,84,255,255,255,255,255,255,69
XV 490 DATA 14,14,14,4,31,31,14,14,14,14,
   10,10,10,10,33,35,35,255,255,35,35,33,
   160,128,128,255,255,128,128,160
```

bonus game

# STAR VENTURE

Article on page 23.

## LISTING 1

Don't type the TYPO II Codes!

```
KG 10 REM STAR VENTURE
JT 20 REM BY RONALD SAARI
FW 30 REM (C) 1985, ANTIC PUBLISHING
CP 40 POKE 106,PEEK(740)
TZ 50 GOSUB 780
HQ 60 DIM S$(1):S$="+"
QT 70 GOSUB 520
XV 80 SH=3:SC=0:SCREEN=0:MA=5:E=15
RS 90 GRAPHICS 0:POKE 756,STARTLIST/256:W
   =0:X=3:Y=12:N=9
VZ 100 ST=15:S$="+"
UR 110 POKE 710,0:POKE 752,1
PZ 120 ? "SCORE:"
ZL 130 POSITION 30,0:? "+ ";SH
QR 140 COLOR ASC("□"):PLOT 2,2:DRAWTO 38,
   2:DRAWTO 38,22:DRAWTO 2,22:DRAWTO 2,3
LX 150 POSITION 2,3:? "□"
NP 160 ON SCREEN GOSUB 940,950,960,970,98
   0
UA 170 A=INT(RND(0)*33)+4:B=INT(RND(0)*19
   )+3
LO 180 LOCATE A,B,L:IF L<>32 THEN 170
LW 190 POSITION A,B:? "."
ZD 200 W=W+1:IF W=MA THEN 220
OI 210 GOTO 170
HZ 220 W=0
TT 230 A=INT(RND(0)*33)+4:B=INT(RND(0)*19
   )+3
HL 240 LOCATE A,B,L:IF L<>32 THEN 230
BZ 250 W=W+1:IF W=10 THEN 270
XO 260 POSITION A,B:? "♥":GOTO 230
FL 270 COLOR ASC("|"):PLOT 38,11:DRAWTO 3
   8,13:COLOR 32:PLOT 2,11:DRAWTO 2,13
AA 280 SOUND 0,100,10,5:SOUND 1,101,10,5
QK 290 FOR T=0 TO 3
BT 300 POSITION T,12:? "+":FOR D=1 TO 30:
   NEXT D:POSITION T,12:? " ":NEXT T:SOUN
   D 0,0,0,0:SOUND 1,0,0,0
NE 310 COLOR ASC("|"):PLOT 2,11:DRAWTO 2,
   13
CJ 320 POSITION 2,13:? "|"
QT 330 POSITION X,Y:? S$
YV 340 IF X=39 THEN SCREEN=SCREEN+1:GOTO
   90
ZM 350 POSITION 8,0:? SC
ZD 360 SOUND 0,5,0,1
JN 370 POSITION 20,0:? E;" "
JO 380 IF PEEK(53279)=6 THEN SOUND 0,0,0,
   0:GOTO 205
BZ 390 FOR T=1 TO 10:NEXT T:POSITION X,Y:
   ? " "
GX 400 IF STICK(0)=14 THEN Y=Y-1
ED 410 IF STICK(0)=13 THEN Y=Y+1
YG 420 IF STICK(0)=7 THEN ST=7
XN 430 IF STICK(0)=11 THEN ST=11
RN 440 IF ST=7 THEN X=X+1:S$="+"
HI 450 IF ST=11 THEN X=X-1:S$="▮"
OQ 460 LOCATE X,Y,L:POKE 77,0
AO 470 IF L<>32 AND L<>0 AND L<>9 THEN 57
   0
CV 480 IF STRIG(0)=0 AND E>0 THEN E=E-1:S
   OUND 0,100,10,15:GOTO 500
EB 490 IF L=9 THEN 570
AV 500 IF L=0 THEN GOSUB 610
NN 510 GOTO 330
TI 520 GOSUB 700
PH 530 POSITION 11,19:? "     PRESS START
   "
BN 540 POKE 53279,8:SOUND 0,0,0,0
SS 550 IF PEEK(53279)=6 THEN POKE 53279,8
   :RETURN
PN 560 GOTO 550
SE 570 POKE 710,52:POSITION X,Y:? "X":FOR
   T=5 TO 0 STEP -1:SOUND 0,T+20,0,T:NEX
   T T:POKE 710,0
FH 580 POSITION X,Y:? " ":FOR T=15 TO 0 S
   TEP -0.4:SOUND 0,T+10,0,T:SOUND 1,T,12
   ,T/2:NEXT T
QE 590 SH=SH-1:IF SH=0 THEN 640
SJ 600 GOTO 90
JN 610 POSITION X,Y:? S$:FOR T=15 TO 0 ST
   EP -1:SOUND 0,121,10,T:SOUND 1,60,10,T
   :SOUND 2,243,10,T:NEXT T
OL 620 N=N-1:SC=SC+100:IF N=0 THEN 680
ZI 630 RETURN
GF 640 ? "K":POSITION 17,9:? "□□□□□□□□":P
   OSITION 17,10:? "□ GAME □"
AY 650 POSITION 17,11:? "□ OVER □":POSITI
   ON 17,12:? "□□□□□□□□"
PE 660 POSITION 2,0:? "SCORE:";SC
RY 670 GOSUB 530:GOTO 80
ZU 680 FOR T=15 TO 0 STEP -1:SOUND 0,150,
   10,T:NEXT T:FOR T=11 TO 13:POSITION 38
   ,T:? " ":NEXT T
ZU 690 RETURN
AE 700 GRAPHICS 0:POKE 710,0:POKE 752,1:P
   OKE 712,165
ET 710 POSITION 11,6:? "□□□□□□□□□□□□□□□□□
   □□"
NU 720 POSITION 11,7:? "□                
    □"
JF 730 POSITION 11,8:? "□  STAR  VENTURE 
    □"
PG 740 POSITION 11,9:? "□                
    □"
ZF 750 POSITION 11,10:? "□□□□□□□□□□□□□□□□
   □□□"
DE 760 POSITION 13,13:? "By Ronald Saari"
BY 770 POSITION 7,16:? "(c) 1985, Antic P
   ublishing":RETURN
JZ 780 POKE 106,PEEK(106)-5:GRAPHICS 17
LN 790 POKE 755,1
GU 800 STARTLIST=(PEEK(106)+1)*256
JO 810 POKE 752,1
AN 820 GOSUB 700:POSITION 7,19:? "Refueli
   ng, Please stand by...":FOR MOVEME=0 T
   O 1023
PP 830 POKE 709,PEEK(20):SOUND 0,(INT(-0.
   24*MOVEME+255)),8,4
JL 840 POKE STARTLIST+MOVEME,PEEK(57344+M
   OVEME):NEXT MOVEME
ZV 850 RESTORE 890
ZJ 860 READ KY:IF KY=-1 THEN RETURN
EJ 870 FOR MOVEME=0 TO 7:READ VALUE:POKE
   KY+STARTLIST+MOVEME,VALUE:NEXT MOVEME
RJ 880 GOTO 860
FS 890 DATA 512,0,0,36,24,24,36,0,0
VY 900 DATA 584,24,90,60,255,255,60,90,24
XE 910 DATA 712,63,31,56,254,254,56,31,63
IP 920 DATA 664,252,248,28,127,127,28,248
   ,252
GK 930 DATA -1
OZ 940 PLOT 20,7:DRAWTO 20,18:RETURN
CB 950 PLOT 12,7:DRAWTO 12,18:PLOT 28,7:D
   RAWTO 28,18:RETURN
WA 960 PLOT 12,4:DRAWTO 28,20:PLOT 28,4:D
   RAWTO 12,20:RETURN
OB 970 PLOT 18,7:DRAWTO 12,7:DRAWTO 12,18
   :DRAWTO 28,18:DRAWTO 28,7:DRAWTO 22,7:
   RETURN
ZJ 980 SCREEN=0:E=E+5:IF MA<20 THEN MA=MA
   +5
ZX 990 RETURN
```

# MINIATURE GOLF

Article on page 46.

## LISTING 1

Don't type the TYPO II Codes!

```
VV 1 REM MINIATURE GOLF
MI 2 REM BY DAVID AND MARISA PLOTKIN
FD 3 REM (c) 1985, ANTIC PUBLISHING
KQ 5 GOSUB 3000
RF 10 GRAPHICS 0:GOSUB 1500:HOLSCR=0:PN=1
   :MAXHOLE=8:GOSUB 1600:REM GET NAMES AN
   D SETUP P/M GRAPHICS
DQ 15 F1=1:STARTHOLE=1
TP 20 FOR HOLENUM=STARTHOLE TO MAXHOLE
BH 30 GOSUB 1750:GOSUB 1000:REM SHOW STAT
   US AND DRAW HOLE
TF 40 IF PN<=NUMPLAY THEN GOSUB 900:GOSUB
    700:POKE 77,0:GOTO 40:REM LOOP TIL EV
   ERYONE HAS DONE THE HOLE
IH 50 PN=1:GOSUB 1450:PRINT #6;CHR$(125);
   :POKE 53278,0:NEXT HOLENUM:REM ERASE P
   /M, SCREEN, GO TO NEXT HOLE
GX 60 GOTO 3100:REM GAME OVER!
XJ 700 REM MOVE THE BALL AROUND THE FIELD

QA 705 HOLSCR=HOLSCR+1:TOTAL(PN)=TOTAL(PN
   )+1:GOSUB 1765:FL=0:OLDX=BALLX:OLDY=BA
   LLY
QS 710 FOR L=1 TO VEL:TESTX=ABS(BALLX+MX-
   48):TESTY=ABS(BALLY+MY-15):LOCATE TEST
   X,TESTY,Z
OV 715 IF (Z=0 AND PEEK(53260)=0) THEN GO
   TO 770
NX 716 SOUND 0,40,8,14:SOUND 0,0,0,0
YG 717 IF Z=0 THEN GOTO 750
MK 720 IF Z=1 THEN MX=-MX:LOCATE ABS(BALL
   X+MX-48),TESTY,Z1:IF Z1<>0 THEN MY=-MY

CQ 730 IF Z=3 THEN MY=-MY:LOCATE TESTX,AB
   S(BALLY+MY-15),Z1:IF Z1<>0 THEN MX=-MX
PY 735 HX=ABS(MX):HY=ABS(MY):HSX=SGN(MX):
   HSY=SGN(MY):IF Z<>2 THEN GOTO 770
PB 736 HSX=HSX+(HSX=0):HSY=HSY+(HSY=0)
JE 740 MX=HY*HSX:MY=HX*HSY:LOCATE ABS(BAL
   LX+MX-48),ABS(BALLY+MY-15),Z1:IF Z1=0
   THEN GOTO 770
WT 745 MX=-HY*HSX:MY=-HX*HSY:LOCATE ABS(B
   ALLX+MX-48),ABS(BALLY+MY-15),Z1:IF Z1=
   0 THEN GOTO 770
QJ 747 MX=-HX*HSX:MY=-HY*HSY:GOTO 770
MR 750 IF PEEK(53260)=4 THEN MY=-MY:REM H
   IT THE BARRIER
PM 760 IF PEEK(53260)=8 THEN GOSUB 850:GO
   TO 790:REM HIT THE HOLE
NL 770 BALLX=BALLX+MX:BALLY=BALLY+MY
SO 775 D=USR(ADR(UD0$),ADR(BALL$),PMB+512
   +BALLY,3,BALLX):IF (BX>=RITEX OR BX<=L
   EFTX) THEN SPEED=-SPEED
DP 776 BX=BX+SPEED:POKE 53250,BX
HL 780 POKE 53278,0:NEXT L:REM CLEAR COLL
   ISIONS
ZV 790 RETURN
ME 800 IF (BX>=RITEX OR BX<=LEFTX) THEN S
   PEED=-SPEED:REM MOVE THE BARRIER
CM 810 BX=BX+SPEED:POKE 53250,BX
ZI 820 RETURN
BY 840 REM BALL GOES IN THE HOLE
QJ 850 FOR WW=0 TO 100 STEP 2:SOUND 0,WW,
   10,4:SOUND 1,100-WW,10,4:POKE 712,WW:N
   EXT WW
YQ 860 SOUND 0,0,0,0:SOUND 1,0,0,0:POKE 7
   12,198
FT 870 PN=PN+1:HOLSCR=0:FL=1:IF PN<=NUMPL
   AY THEN GOSUB 1750:GOSUB 1490:GOSUB 10
   80:POKE 53278,0
ZU 880 RETURN
ZE 900 REM MOVE THE CLUB UNDER JOYSTICK C
   ONTROL
UM 905 CLUBX=BALLX:CLUBY=BALLY
QT 910 P6=PEEK(632):CLUBX=CLUBX+2*(P6>4 A
   ND P6<8)*(CLUBX<204)-2*(P6>8 AND P6<12
   )*(CLUBX>46)
GB 915 IF PEEK(53260)>=4 THEN BALLY=BALLY
   +MY:D=USR(ADR(UD0$),ADR(BALL$),PMB+512
   +BALLY,3,BALLX):POKE 53278,0
PW 920 CLUBY=CLUBY+2*(P6=5 OR P6=13 OR P6
   =9)*(CLUBY<112)-2*(P6=10 OR P6=14 OR P
   6=6)*(CLUBY>12)
CY 925 IF FL=1 OR PEEK(53279)<>6 OR HOLSC
   R=0 THEN 930
IX 926 FL=1:HOLSCR=HOLSCR-1:TOTAL(PN)=TOT
   AL(PN)-1:GOSUB 1765:GOSUB 1480
MG 927 BALLX=OLDX:BALLY=OLDY:D=USR(ADR(UD
   0$),ADR(BALL$),PMB+512+BALLY,3,BALLX):
   CLUBX=BALLX:CLUBY=BALLY
BS 930 D=USR(ADR(UD1$),ADR(CLUB$),PMB+639
   +CLUBY,9,CLUBX)
MG 931 IF PEEK(53279)=5 THEN GOSUB 3400:R
   EM DISPLAY THE SCORES
QS 933 IF PEEK(644)=1 THEN GOSUB 800:GOTO
    910
FR 935 IF (BALLY=CLUBY AND BALLX=CLUBX) T
   HEN PRINT CHR$(253);:GOTO 910
WJ 940 DX=ABS(BALLX-CLUBX):DY=ABS(BALLY-C
   LUBY):MX=SGN(BALLX-CLUBX):IF DX<>0 THE
   N MY=DY/DX*SGN(BALLY-CLUBY):SS=DX
ON 945 IF DY>DX THEN MX=DX/DY*SGN(BALLX-C
   LUBX):MY=SGN(BALLY-CLUBY):SS=DY
DZ 950 FOR LS=1 TO SS:CLUBX=CLUBX+MX:CLUB
   Y=CLUBY+MY:SOUND 0,LS,8,2
VZ 960 D=USR(ADR(UD1$),ADR(CLUB$),PMB+639
   +CLUBY,9,CLUBX):NEXT LS:REM MOVE THE C
   LUB
FV 965 M=ABS(DX)+ABS(DY):S=3+(M>15)+(M>20
   )+(M>25)+2*(M>30)+2*(M>35)
PR 970 SOUND 0,40,8,14:SOUND 0,0,0,0:VEL=
   S*M:REM SET SPEED OF BALL
EF 980 D=USR(ADR(UD1$),ADR(BLANK$),PMB+63
   9+CLUBY,9,CLUBX):REM ERASE CLUB
ZX 990 RETURN
YH 1000 RESTORE (2000+(HOLENUM-1)*20):REA
   D HOLEX,HOLEY,STARTX,STARTY,NUMTARG
CR 1005 COLOR 1:PLOT 0,0:DRAWTO 0,79:PLOT
    159,0:DRAWTO 159,79:COLOR 3:PLOT 0,0:
   DRAWTO 159,0:PLOT 0,79
QC 1006 DRAWTO 159,79:COLOR 2:PLOT 0,0:PL
   OT 0,79:PLOT 159,0:PLOT 159,79:COLOR 1
   :PLOT 1,0:DRAWTO 1,79
CU 1010 FOR L2=1 TO NUMTARG:READ TYPE,X,Y
   :IF TYPE=1 OR TYPE=2 THEN GOSUB 1100:R
   EM DRAW TYPE 1/2-DOWN/UP TRIANGLE
ZC 1020 IF TYPE=3 OR TYPE=4 THEN GOSUB 12
   00:REM DRAW TYPE 3/4-RIGHT/LEFT TRIANG
   LE
VS 1030 IF TYPE=5 THEN GOSUB 1300:REM DRA
   W SQUARE OR RECTANGLE
AI 1040 IF TYPE=6 THEN GOSUB 1400:REM DRA
   W BARRIER
PQ 1045 IF TYPE=7 THEN GOSUB 1430:REM DRA
   W THE DIAGONAL LINES
DN 1050 NEXT L2
GK 1060 HOLEX=HOLEX+48:HOLEY=HOLEY+16:FOR
    W=0 TO 3:POKE PMB+896+HOLEY+W,HOLE(W)
   :NEXT W:POKE 53251,HOLEX
NG 1070 STARTX=STARTX+48:STARTY=STARTY+15
   :CLUBX=STARTX:CLUBY=STARTY
AE 1075 D=USR(ADR(UD1$),ADR(CLUB$),PMB+63
   9+CLUBY,9,CLUBX)
TJ 1080 BALLX=STARTX:BALLY=STARTY:D=USR(A
   DR(UD0$),ADR(BALL$),PMB+512+BALLY,3,BA
```

```
   LLX)
BA 1090 RETURN
FH 1100 READ X1:XC=(X+X1)/2:I=(TYPE=1)-(T
   YPE=2)
LT 1110 LP=Y-I:FOR LQ=X TO XC:COLOR 1:LP=
   LP+I:PLOT LQ,Y:DRAWTO LQ,LP:COLOR 2:PL
   OT LQ,LP:PLOT LQ,LP+I
AM 1115 NEXT LQ:LP=LP+I
UA 1120 FOR LQ=XC TO X1:COLOR 1:LP=LP-I:P
   LOT LQ,Y:DRAWTO LQ,LP:COLOR 2:PLOT LQ,
   LP:PLOT LQ,LP+I:NEXT LQ
VA 1130 COLOR 3:PLOT X+1,Y:DRAWTO X1-1,Y:
   RETURN
NJ 1200 READ Y1:YC=(Y+Y1)/2:I=(TYPE=4)-(T
   YPE=3)
XN 1210 LQ-X+I:FOR LP=Y TO YC:COLOR 1:LQ=
   LQ-I:PLOT X,LP:DRAWTO LQ,LP:COLOR 2:PL
   OT LQ,LP:PLOT LQ-I,LP
CV 1215 NEXT LP:LQ=LQ-I
WH 1220 FOR LP=YC TO Y1:COLOR 1:LQ=LQ+I:P
   LOT X,LP:DRAWTO LQ,LP:COLOR 2:PLOT LQ,
   LP:PLOT LQ-I,LP:NEXT LP
AM 1230 RETURN
QH 1300 READ X1,Y1
VU 1310 COLOR 1:FOR LP=Y TO Y1:PLOT X,LP:
   DRAWTO X1,LP:NEXT LP:COLOR 3:PLOT X,Y:
   DRAWTO X1,Y:PLOT X,Y1:DRAWTO X1,Y1
MH 1320 COLOR 2:PLOT X,Y:PLOT X1,Y:PLOT X
   1,Y1:PLOT X,Y1
AO 1330 RETURN
ZA 1400 READ X1,SPEED:BX=X+48:BY=Y+15:LEF
   TX=BX:RITEX=X1+48:BX=BX+SPEED
YK 1410 D=USR(ADR(UD2$),ADR(BARRIER$),PMB
   +768+BY,5,BX)
AN 1420 RETURN
UY 1430 READ X1:Y1=Y+ABS(X1-X):COLOR 2:PL
   OT X,Y:DRAWTO X1,Y1:PLOT X,Y+1:DRAWTO
   X1,Y1+1
AT 1440 RETURN
BM 1450 REM ERASE P/M GRAPHICS SHAPES
NY 1460 FOR W=0 TO 3:POKE PMB+896+HOLEY+W
   ,0:NEXT W:REM ERASE THE HOLE
YI 1470 D=USR(ADR(UD2$),ADR(BLANK$),PMB+7
   68+BY,5,0):REM THEN THE BARRIER
UX 1480 D=USR(ADR(UD1$),ADR(BLANK$),PMB+6
   39+CLUBY,9,0):REM NOW THE CLUB
UH 1490 D=USR(ADR(UD0$),ADR(BLANK$),PMB+5
   12+BALLY,3,0):RETURN :REM FINALLY THE
   BALL
SQ 1500 REM GET THE NAMES OF PLAYERS
ZK 1505 POSITION 10,3:? "MINIATURE GOLF";

ZR 1510 POSITION 0,5:? "How many players
   (max 8)";:INPUT NUMPLAY:IF NUMPLAY>8 T
   HEN ? CHR$(125):GOTO 1510
SL 1520 DIM NAME$(NUMPLAY*10),NN$(10),TOT
   AL(NUMPLAY)
BU 1530 FOR L=1 TO NUMPLAY:PRINT "NAME OF
    PLAYER #";L;" (MAX 10 LETTERS)":INPUT
    NN$:R=LEN(NN$)+1
OK 1540 IF R<=10 THEN FOR L1=R TO 10:NN$(
   L1,L1)=" ":NEXT L1
PY 1550 NAME$((L-1)*10+1,L*10)=NN$:TOTAL(
   L)=0:NEXT L:RETURN
GL 1600 REM SETUP P/M GRAPHICS
ER 1610 PMBASE=PEEK(106)-24:POKE 88,0:POK
   E 89,PMBASE:? CHR$(125)
IZ 1620 GRAPHICS 7:PMB=PMBASE*256:POKE 54
   279,PMBASE:POKE 53277,3:POKE 559,46:PO
   KE 623,1:POKE 752,1
FX 1630 DIM UD0$(44),UD1$(44),UD2$(44):RE
   STORE 1640:FOR W=1 TO 44:READ P:UD0$(W
   ,W)=CHR$(P):NEXT W
JZ 1640 DATA 104,104,133,215,104,133,214,
    104,133,217,104,133,216,104,133,218
AT 1650 DATA 104,170,160,0,177,214,145,21
   6, 200,208,4,230,215,230,217,202
EK 1660 DATA 208,242,198,218,16,238,104,
   104,141,0,208,96
EL 1670 UD1$=UD0$:UD2$=UD0$:UD1$(42,42)=C
   HR$(1):UD2$(42,42)=CHR$(2)
OR 1680 POKE 704,14:POKE 705,24:POKE 706,
   52:POKE 707,100:POKE 708,200:POKE 709,
   228:POKE 710,206:POKE 712,198
CX 1690 DIM CLUB$(9),BARRIER$(5),HOLE(4),
   BALL$(3),BLANK$(9):RESTORE 1740
YL 1700 FOR W=1 TO 9:READ P:CLUB$(W,W)=CH
   R$(P):NEXT W
AS 1710 FOR W=1 TO 5:READ P:BARRIER$(W,W)
   =CHR$(P):NEXT W
YC 1720 FOR W=0 TO 3:READ P:HOLE(W)=P:NEX
   T W
JX 1730 FOR W=1 TO 3:READ P:BALL$(W,W)=CH
   R$(P):NEXT W
OP 1735 FOR W=1 TO 9:BLANK$(W,W)=CHR$(0):
   NEXT W:RETURN
IG 1740 DATA 0,0,124,252,252,252,252,0,0,
   0,255,255,255,0,112,248,248,112,0,128,
   0
HO 1750 POKE 656,0:POKE 657,0:PRINT "PLAY
   ER: ";NAME$((PN-1)*10+1,PN*10);:POKE 6
   57,22:? "SELECT for scores";
VZ 1760 POKE 656,1:POKE 657,1:PRINT "HOLE
    NUMBER: ";HOLENUM;:POKE 657,22:? "OPT
   ION to return";
JP 1765 POKE 656,2:POKE 657,1
CV 1770 PRINT "HOLE SCORE: ";HOLSCR;"  ";
   :POKE 657,21:PRINT "TOTAL SCORE: ";TOT
   AL(PN);"  ";:RETURN
AS 2000 DATA 5,7,80,72,6,1,68,1,92,5,1,50
   ,45,78,5,45,22,65,78,5,95,22,115,78,5,
   115,50,158,78,6,65,22,87,2
DW 2020 DATA 4,7,142,65,2,5,1,35,125,78,7
   ,130,1,158
LA 2040 DATA 78,7,80,66,5,5,1,1,60,78,5,1
   00,1,159,78,7,70,1,61,7,90,1,99,1,66,1
   5,94
TY 2060 DATA 10,70,143,66,3,5,41,30,119,7
   8,7,20,1,1,7,140,1,158
QJ 2080 DATA 15,60,143,60,3,5,40,20,44,78
   ,5,80,1,84,60,5,120,20,124,78
WY 2100 DATA 78,20,80,70,10,1,40,1,70,1,9
   0,1,120,2,40,50,70,2,90,50,120
DC 2101 DATA 5,1,1,54,78,5,54,50,70,78,5,
   106,1,158,78,5,90,50,106,78,6,55,27,97

CI 2102 DATA 2,7,72,30,84
MW 2120 DATA 10,15,128,65,4,5,1,40,80,79,
   7,100,1,120,7,140,40,158,7,1,22,12
YH 2140 DATA 145,26,40,65,7,2,90,55,130,5
   ,70,34,109,78,5,110,55,158,78,7,130,1,
   110,5,70,21,110,22
FK 2141 DATA 5,1,1,10,78,7,53,1,20
RG 3000 GRAPHICS 2+16:POKE 708,36
WR 3010 POKE 752,1:POSITION 2,1:? #6;"DAV
   ID AND MARISA     plotkin  PRESENT";:PO
   SITION 1,3
JL 3015 ? #6;"*□*□*□*□*□*□*□*□";
SE 3020 POSITION 1,4:? #6;"□ Miniature go
   lf *";:POSITION 5,6:? #6;"PRESS FIRE";

RD 3025 POSITION 1,5:? #6;"*□*□*□*□*□*□
   *□*□";
HW 3030 HOLD=PEEK(708):POKE 708,PEEK(710)
   :POKE 710,HOLD
AZ 3040 FOR W=1 TO 10:NEXT W:IF STRIG(0)=
   0 THEN RETURN
PO 3050 GOTO 3030
PP 3100 REM GAME OVER SEQUENCE
RI 3110 POKE 53277,0:POKE 559,34:GRAPHICS
    1+16:POKE 708,52:POSITION 0,0:? #6;"
      MINIATURE GOLF ";:REM TURN OFF P/M
WP 3120 POSITION 0,1:? #6;"      SCORE BOA
   RD";:POSITION 0,2:? #6;CHR$(138);:POSI
   TION 1,2:? #6;CHR$(170);
PE 3125 POSITION 0,23:? #6;CHR$(10);:POSI
   TION 1,23:? #6;CHR$(170);:FOR W=2 TO 1
   7 STEP 3:POSITION W,2
LV 3130 ? #6;CHR$(10);:POSITION W+1,2:? #
   6;CHR$(138);:POSITION W+2,2:? #6;CHR$(
   170);
AE 3140 POSITION W,23:? #6;CHR$(138);:POS
   ITION W+1,23:? #6;CHR$(10);:POSITION W
   +2,23:? #6;CHR$(170);:NEXT W
CB 3150 FOR W=3 TO 21 STEP 3:POSITION 19,
   W:? #6;CHR$(10);:POSITION 19,W+1:? #6;
   CHR$(138);
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CX 3160 POSITION 19,W+2:? #6;CHR$(170);:N
   EXT W
RD 3170 FOR W=3 TO 21 STEP 3:POSITION 0,W
   :? #6;CHR$(170);:POSITION 0,W+1:? #6;C
   HR$(138);
IH 3180 POSITION 0,W+2:? #6;CHR$(10);:NEX
   T W:FOR PN=1 TO NUMPLAY:POSITION 2,PN+
   3
UQ 3190 ? #6;NAME$((PN-1)*10+1,PN*10);:PO
   SITION 14,PN+3:? #6;TOTAL(PN);:NEXT PN
   :REM PRINT THE NAMES AND SCORES
CS 3200 WIN=1:IF NUMPLAY=1 THEN GOTO 3240
   :REM ONLY ONE PLAYER
XE 3210 FOR PN=2 TO NUMPLAY:IF TOTAL(PN)<
   TOTAL(PN-1) THEN WIN=PN:REM FIND THE W
   INNER (LOW SCORE)
PT 3220 NEXT PN:FOR PN=1 TO NUMPLAY:IF PN
   <>WIN THEN IF TOTAL(PN)=TOTAL(WIN) THE
   N WIN=0
SD 3230 NEXT PN
RR 3240 POSITION 2,21:IF WIN=0 THEN ? #6;
   "NO WINNER--A TIE!":GOTO 3260
AL 3250 ? #6;"WINNER:";NAME$((WIN-1)*10+1
   ,WIN*10);
ZM 3260 POSITION 1,22:? #6;"PRESS fire TO
    PLAY";
RR 3300 HOLD=PEEK(709):POKE 709,PEEK(710)
   :POKE 710,PEEK(711):POKE 711,HOLD
PV 3310 FOR W=1 TO 10:NEXT W:IF STRIG(0)=
   0 THEN RUN
PI 3320 GOTO 3300
YY 3400 REM DISPLAY THE SCORES
MZ 3410 ? CHR$(125):FOR LLQ=1 TO NUMPLAY
WL 3420 IF LLQ/2<>INT(LLQ/2) THEN POKE 65
   7,0:GOTO 3440
VH 3430 POKE 657,20
WK 3440 POKE 656,INT((LLQ-1)/2)
ES 3450 ? NAME$((LLQ-1)*10+1,LLQ*10);" ";
   TOTAL(LLQ):NEXT LLQ
YS 3460 IF PEEK(53279)<>3 THEN 3460
RV 3470 ? CHR$(125):GOSUB 1750:RETURN
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# LISTING 2

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PA 10 REM MINI GOLF CONSTRUCTION SET
UE 20 REM BY DAVID AND MARISA PLOTKIN
FW 30 REM (C) 1985, ANTIC PUBLISHING
NK 100 GRAPHICS 0:GOSUB 800:REM PRINT THE
    TITLE
YN 110 DIM FILE$(15),T1(45),T2(45),T3(45)
   ,T4(45),T5(60),T6(3),T7(45),X(60),T$(2
   ),XX(60)
AH 120 REM OUTPUT DEVICE
KA 130 ? "WHAT DEVICE AND FILENAME (FOR C
   ASSETTE USE C:)":INPUT #16;FILE$:T$=
   FILE$(1,2)
LS 140 IF (T$="C:" OR T$="D:" OR T$="D1"
   OR T$="D2") THEN GOTO 160
IP 150 ? "INVALID DEVICE SPECIFIED. PLEAS
   E USE  C: OR D:FILENAME":GOTO 130
US 160 GOSUB 1000:REM INITIAL QUANTITIES
MT 170 GOSUB 1100:REM TYPE 1 (DOWN TRIANG
   LES)
QH 180 GOSUB 1200:REM TYPE 2 (UP TRIANGLE
   S)
AX 190 GOSUB 1300:REM TYPE 3 (RIGHT TRIAN
   GLES)
BN 200 GOSUB 1400:REM TYPE 4 (LEFT TRIANG
   LES)
WF 210 GOSUB 1500:REM TYPE 5 (RECTANGLES)
DC 220 GOSUB 1600:REM TYPE 6 (MOVING BARR
   IER)
WA 230 GOSUB 1700:REM TYPE 7 (DIAGONAL LI
   NES)
KF 240 TRAP 240:GOSUB 1800:REM PREVIEW, E
   DIT OR SAVE MENU
AO 250 ON CHOICE GOTO 2000,2300,2500,799:
   REM CHOOSE THE MENU SELECTION
PP 799 END
ZX 800 ? "K":POSITION 4,0:? "MINIATURE GO
   LF CONSTRUCTION SET":? :RETURN
XW 850 ? "INVALID QUANTITY ENTERED. PLEAS
   E TRY  AGAIN":RETURN
ZI 1000 GOSUB 800:? "WHAT HOLE NUMBER:";:
   INPUT #16;HOLE
TC 1010 ? "WHAT X POSITION FOR HOLE (0-15
   9)";:INPUT #16;HOLEX
IK 1020 IF (HOLEX<0 OR HOLEX>159) THEN GO
   SUB 850:GOTO 1010
IP 1030 ? "WHAT Y POSITION FOR HOLE (0-79
   )";:INPUT #16;HOLEY
EM 1040 IF (HOLEY<0 OR HOLEY>79) THEN GOS
   UB 850:GOTO 1030
TO 1050 ? "WHAT START X POS. FOR BALL (0-
   159)";:INPUT #16;STARTX
FH 1060 IF (STARTX<0 OR STARTX>159) THEN
   GOSUB 850:GOTO 1050
BW 1070 ? "WHAT START Y POS. FOR BALL (0-
   79)";:INPUT #16;STARTY
XW 1080 IF (STARTY<0 OR STARTY>79) THEN G
   OSUB 850:GOTO 1070
BA 1090 RETURN
MF 1100 GOSUB 800:? "◥◤ DOWN TRIANGLE PLA
   CEMENT ◥◤"
SN 1110 ? "HOW MANY DOWN TRIANGLES (15 MA
   X)";:INPUT T1
OO 1120 IF T1>15 THEN GOSUB 850:GOTO 1110
BT 1130 IF T1=0 THEN GOTO 1190
EJ 1140 ? "FORMAT: UPPER LEFT X AND Y, UP
   PER      RIGHT X"
MK 1150 FOR L=1 TO T1:LL=(L-1)*3
KX 1160 ? "TRIANGLE NUMBER ";L;" POSITION
   ";
WF 1170 INPUT X,Y,X1:IF (X>159 OR X1>159
   OR Y>79 OR X1<X) THEN GOSUB 850:GOTO 1
   160
XP 1180 T1(LL)=X:T1(LL+1)=Y:T1(LL+2)=X1:N
   EXT L
BC 1190 RETURN
LS 1200 GOSUB 800:? "◢◣ UP TRIANGLE PLACE
   MENT ◢◣"
QL 1210 ? "HOW MANY UP TRIANGLES (15 MAX)
   ";:INPUT T2
QK 1220 IF T2>15 THEN GOSUB 850:GOTO 1210
DE 1230 IF T2=0 THEN GOTO 1290
ZF 1240 ? "FORMAT: LOWER LEFT X AND Y, LO
   WER      RIGHT X"
NE 1250 FOR L=1 TO T2:LL=(L-1)*3
KZ 1260 ? "TRIANGLE NUMBER ";L;" POSITION
   ";
ZG 1270 INPUT X,Y,X1:IF (X>159 OR X1>159
   OR Y>79 OR X1<X) THEN GOSUB 850:GOTO 1
   260
ZP 1280 T2(LL)=X:T2(LL+1)=Y:T2(LL+2)=X1:N
   EXT L
BE 1290 RETURN
SB 1300 GOSUB 800:? "◣ RIGHT TRIANGLE PLA
   CEMENT ◣"
WL 1301 ? "◤                             ◤"
ZF 1310 ? "HOW MANY RIGHT TRIANGLES (15 M
   AX)";:INPUT T3
SG 1320 IF T3>15 THEN GOSUB 850:GOTO 1310
EP 1330 IF T3=0 THEN GOTO 1390
RA 1340 ? "FORMAT: UPPER LEFT X AND Y, LO
   WER      LEFT Y"
NY 1350 FOR L=1 TO T3:LL=(L-1)*3
LB 1360 ? "TRIANGLE NUMBER ";L;" POSITION
   ";
TL 1370 INPUT X,Y,Y1:IF (X>159 OR Y>79 OR
    Y1>79 OR Y1<Y) THEN GOSUB 850:GOTO 13
   60
CY 1380 T3(LL)=X:T3(LL+1)=Y:T3(LL+2)=Y1:N
   EXT L
BG 1390 RETURN
BV 1400 GOSUB 800:? "◢ LEFT TRIANGLE PLAC
   EMENT ◢"
CH 1401 ? "◥                             ◥"
OQ 1410 ? "HOW MANY LEFT TRIANGLES (15 MA
   X)";:INPUT T4
UC 1420 IF T4>15 THEN GOSUB 850:GOTO 1410
GA 1430 IF T4=0 THEN GOTO 1490
VA 1440 ? "FORMAT: UPPER RIGHT X AND Y, L
   OWER     RIGHT Y"
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OS 1450 FOR L=1 TO T4:LL=(L-1)*3
LD 1460 ? "TRIANGLE NUMBER ";L;" POSITION
   ";
WL 1470 INPUT X,Y,Y1:IF (X>159 OR Y>79 OR
    Y1>79 OR Y1<Y) THEN GOSUB 850:GOTO 14
   60
EY 1480 T4(LL)=X:T4(LL+1)=Y:T4(LL+2)=Y1:N
   EXT L
BI 1490 RETURN
PD 1500 GOSUB 800:? "SQUARE/RECTANGLE PLA
   CEMENT"
NC 1510 ? "HOW MANY RECTANGLES (15 MAX)";
   :INPUT T5
VY 1520 IF T5>15 THEN GOSUB 850:GOTO 1510

HL 1530 IF T5=0 THEN GOTO 1590
XD 1540 ? "FORMAT: UPPER LEFT X AND Y, LO
   WER      RIGHT X AND Y"
QP 1550 FOR L=1 TO T5:LL=(L-1)*4
BJ 1560 ? "RECTANGLE NUMBER ";L;" POS.";
TS 1570 INPUT X,Y,X1,Y1:IF (X>159 OR X1>1
   59 OR Y>79 OR Y1>79 OR X1<X OR Y1<Y) T
   HEN GOSUB 850:GOTO 1560
CB 1580 T5(LL)=X:T5(LL+1)=Y:T5(LL+2)=X1:T
   5(LL+3)=Y1:NEXT L
BK 1590 RETURN
LI 1600 GOSUB 800:? "MOVING BARRIER PLACE
   MENT"
TH 1610 ? "HOW MANY BARRIERS (0-NONE 1-FO
   R        BARRIER)";:INPUT T6
US 1620 IF (T6<>0 AND T6<>1) THEN GOSUB 8
   50:GOTO 1610
IW 1630 IF T6=0 THEN GOTO 1690
OB 1640 ? "FORMAT: LEFT X AND Y BOUNDARY,
    RIGHT XBOUNDARY"
TU 1650 INPUT BX,BY,BX1:IF (BX>159 OR BX1
   >159 OR BY>79 OR BX1<BX) THEN GOSUB 85
   0:GOTO 1650
ZJ 1660 ? "WHAT SPEED (3-4 WORKS BEST)";:
   INPUT SPEED
ZO 1670 T6(0)=BX:T6(1)=BY:T6(2)=BX1:T6(3)
   =SPEED
BM 1690 RETURN
NV 1700 GOSUB 800:? "DIAGONAL LINE PLACEM
   ENT"
UI 1710 ? "HOW MANY DIAGONAL LINES (15 MA
   X)";:INPUT T7
ZO 1720 IF T7>15 THEN GOSUB 850:GOTO 1710
KH 1730 IF T7=0 THEN GOTO 1790
OV 1740 ? "FORMAT: UPPER X AND Y, LOWER X
   "
RA 1750 FOR L=1 TO T7:LL=(L-1)*3
MK 1760 ? "DIAGONAL LINE NUMBER ";L;" POS
   .";
FJ 1770 INPUT X,Y,X1:IF (X>159 OR X1>159
   OR Y>79) THEN GOSUB 850:GOTO 1760
JP 1780 T7(LL)=X:T7(LL+1)=Y:T7(LL+2)=X1:N
   EXT L
BO 1790 RETURN
TP 1800 GRAPHICS 0:GOSUB 800:? "      MAIN
   MENU":?
NB 1810 ? "1. PREVIEW HOLE":? "2. EDIT HO
   LE DATA":? "3. SAVE DATA":? "4. QUIT T
   HIS PROGRAM":?
CD 1820 ? "YOUR CHOICE";:INPUT CHOICE:IF
   (CHOICE<1 OR CHOICE>4) THEN ? :GOSUB 8
   50:? :GOTO 1810
AY 1830 RETURN
HB 2000 REM PREVIEW THE HOLE (DRAW TARGET
   S)
TX 2004 GRAPHICS 7:POKE 752,1:POKE 708,20
   0:POKE 709,228:POKE 710,206:POKE 712,1
   98:TRAP 3250
RR 2005 COLOR 1:PLOT 0,0:DRAWTO 0,79:PLOT
    159,0:DRAWTO 159,79:COLOR 3:PLOT 0,0:
   DRAWTO 159,0
KJ 2006 PLOT 0,79:DRAWTO 159,79:COLOR 2:P
   LOT 0,0:PLOT 0,79:PLOT 159,0:PLOT 159,
   79
UR 2010 IF T1=0 THEN GOTO 2040:REM DRAWT
   DOWN TRIANGLES
IW 2020 FOR L=1 TO T1:LL=(L-1)*3:X=T1(LL)
   :Y=T1(LL+1):X1=T1(LL+2)
KI 2030 XC=(X+X1)/2:I=1:GOSUB 3000:NEXT L
   :REM DRAW TYPE 1
UW 2040 IF T2=0 THEN GOTO 2070:REM DRAW U
   P TRIANGLES
OZ 2050 FOR L=1 TO T2:LL=(L-1)*3:X=T2(LL)
   :Y=T2(LL+1):X1=T2(LL+2)
EG 2060 XC=(X+X1)/2:I=-1:GOSUB 3000:NEXT
   L:REM DRAW TYPE 2
ZK 2070 IF T3=0 THEN GOTO 2100:REM DRAW R
   IGHT TRIANGLES
XB 2080 FOR L=1 TO T3:LL=(L-1)*3:X=T3(LL)
   :Y=T3(LL+1):Y1=T3(LL+2)
IY 2090 YC=(Y+Y1)/2:I=-1:GOSUB 3100:NEXT
   L:REM DRAW TYPE 3
ZO 2100 IF T4=0 THEN GOTO 2150:REM DRAW L
   EFT TRIANGLES
CC 2110 FOR L=1 TO T4:LL=(L-1)*3:X=T4(LL)
   :Y=T4(LL+1):Y1=T4(LL+2)
SS 2120 YC=(Y+Y1)/2:I=1:GOSUB 3100:NEXT L
   :REM DRAW TYPE 4
DZ 2150 IF T5=0 THEN GOTO 2171:REM DRAW R
   ECTANGLES
XE 2160 FOR L=1 TO T5:LL=(L-1)*4:X=T5(LL)
   :Y=T5(LL+1):X1=T5(LL+2):Y1=T5(LL+3)
CJ 2170 GOSUB 3200:NEXT L:REM DRAW TYPE 5

KR 2171 IF T7=0 THEN GOTO 2180:REM DRAW D
   IAGONAL LINES
SL 2172 FOR L=1 TO T7:LL=(L-1)*3:X=T7(LL)
   :Y=T7(LL+1):X1=T7(LL+2)
GS 2173 Y1=Y+ABS(X1-X):COLOR 2:PLOT X,Y:D
   RAWTO X1,Y1:PLOT X,Y+1:DRAWTO X1,Y1+1
RB 2174 NEXT L:REM DRAW TYPE 7
WX 2180 COLOR 3:PLOT HOLEX+1,HOLEY:DRAWTO
    HOLEX+3,HOLEY:PLOT HOLEX+1,HOLEY+4:DR
   AWTO HOLEX+3,HOLEY+4:REM DRAW HOLE
VE 2190 FOR L=HOLEY+1 TO HOLEY+3:PLOT HOL
   EX,L:DRAWTO HOLEX+4,L:NEXT L
AB 2195 IF T6=0 THEN GOTO 2220
BD 2200 FOR L=BX TO BX+8 STEP 2:COLOR 2:P
   LOT L,BY:DRAWTO L,BY+2:REM DRAW THE BA
   RRIER
RZ 2210 COLOR 3:PLOT L+1,BY:DRAWTO L+1,BY
   +2:NEXT L
ZU 2220 LOCATE STARTX,STARTY,Z:Z=Z+2:COLO
   R Z:PLOT STARTX,STARTY
VB 2230 POKE 764,255:? "HIT ANY KEY TO RE
   TURN TO MENU";
XC 2240 IF PEEK(764)=255 THEN 2240
YK 2250 POKE 764,255:GOTO 240
NV 2300 REM EDIT HOLE DATA
RN 2310 GRAPHICS 0:GOSUB 800:? "EDIT HOLE
    DATA":? :?
EL 2320 ? "ENTER WHICH TYPE OF OBJECT TO
   EDIT":? "1. DOWN TRIANGLES"
MH 2330 ? "2. UP TRIANGLES":? "3. RIGHT T
   RIANGLES":? "4. LEFT TRIANGLES":? "5.
   RECTANGLES"
KR 2340 ? "6. MOVING BARRIER":? "7. DIAGO
   NAL LINES":? "8. INITIAL DATA (HOLE NU
   MBER,HOLE         LOC.,BALL LOC.)"
DG 2350 ? "9. RETURN TO MAIN MENU"
SV 2360 ? :? "YOUR CHOICE";:INPUT ANS:IF
   (ANS<1 OR ANS>9) THEN GOSUB 850:GOTO 2
   360
CX 2370 IF ANS=9 THEN GOTO 240
YG 2380 ON ANS GOSUB 1100,1200,1300,1400,
   1500,1600,1700,1000
QE 2390 GOTO 2310
OQ 2500 REM SAVE DATA TO DISK OR CASSETTE

CX 2510 GRAPHICS 0:GOSUB 800:? :? "PLEASE
    WAIT.  SAVING YOUR DATA..."
HS 2515 ND=(T1+T2+T3+T4+T7)*4+(T5+T6)*5
XS 2520 LINE=(HOLE-1)*20+2000:NUMTARG=T1+
   T2+T3+T4+T5+T6+T7:PLUS=0:COUNT=0:CLOSE
    #1:OPEN #1,8,0,FILE$:GOSUB 2710
MT 2530 PRINT #1;HOLEX;",";HOLEY;",";STAR
   TX;",";STARTY;",";NUMTARG;",";:COUNT=5

DZ 2540 IF T1=0 THEN GOTO 2560
DD 2550 TYPE=1:FOR L=1 TO T1:LL=(L-1)*3:X
   X(LL)=T1(LL):XX(LL+1)=T1(LL+1):XX(LL+2
   )=T1(LL+2):GOSUB 2750:NEXT L
GP 2560 IF T2=0 THEN GOTO 2580
LZ 2570 TYPE=2:FOR L=1 TO T2:LL=(L-1)*3:X
   X(LL)=T2(LL):XX(LL+1)=T2(LL+1):XX(LL+2
```

continued on next page




```
   )=T2(LL+2):GOSUB 2750:NEXT L
AE 2580 IF T3=0 THEN GOTO 2600
UV 2590 TYPE=3:FOR L=1 TO T3:LL=(L-1)*3:X
   X(LL)=T3(LL):XX(LL+1)=T3(LL+1):XX(LL+2
   )=T3(LL+2):GOSUB 2750:NEXT L
BS 2600 IF T4=0 THEN GOTO 2620
CP 2610 TYPE=4:FOR L=1 TO T4:LL=(L-1)*3:X
   X(LL)=T4(LL):XX(LL+1)=T4(LL+1):XX(LL+2
   )=T4(LL+2):GOSUB 2750:NEXT L
FI 2620 IF T5=0 THEN GOTO 2650
BR 2630 TYPE=5:FOR L=1 TO T5:LL=(L-1)*4:X
   X(LL)=T5(LL):XX(LL+1)=T5(LL+1):XX(LL+2
   )=T5(LL+2):GOSUB 2750
KD 2640 PRINT #1;T5(LL+3);:COUNT=COUNT+1:
   ND=ND-1:GOSUB 2765:NEXT L
JB 2650 IF T6=0 THEN GOTO 2680
BX 2660 TYPE=6:LL=0:FOR L=0 TO 2:XX(L)=T6
   (L):NEXT L:GOSUB 2750
PQ 2670 PRINT #1;T6(3);:COUNT=COUNT+1:ND=
   ND-1:GOSUB 2765
CT 2680 IF T7=0 THEN GOTO 2700
DJ 2690 TYPE=7:FOR L=1 TO T7:LL=(L-1)*3:X
   X(LL)=T7(LL):XX(LL+1)=T7(LL+1):XX(LL+2
   )=T7(LL+2):GOSUB 2750:NEXT L
PO 2700 GOTO 240
MM 2710 PRINT #1;LINE+PLUS;" DATA ";:RETU
   RN :REM PRINT NEW LINE
YG 2750 PRINT #1;TYPE;",";XX(LL);",";XX(L
   L+1);",";XX(LL+2);
CX 2760 COUNT=COUNT+4:ND=ND-4
XK 2765 IF (COUNT<21 AND ND>0) THEN PRINT
    #1;",";:GOTO 2780
ZE 2770 COUNT=0:PLUS=PLUS+1:PRINT #1;"":I
   F ND>0 THEN GOSUB 2710:REM NEW LINE
BM 2780 RETURN
BV 3000 REM DRAW TYPE 1 OR 2
LT 3010 LP=Y-I:FOR LQ=X TO XC:COLOR 1:LP=
   LP+I:PLOT LQ,Y:DRAWTO LQ,LP:COLOR 2:PL
   OT LQ,LP:PLOT LQ,LP+I
ZV 3020 NEXT LQ:LP=LP+I
UD 3030 FOR LQ=XC TO X1:COLOR 1:LP=LP-I:P
   LOT LQ,Y:DRAWTO LQ,LP:COLOR 2:PLOT LQ,
   LP:PLOT LQ,LP+I:NEXT LQ
VD 3040 COLOR 3:PLOT X+1,Y:DRAWTO X1-1,Y:
   RETURN
FJ 3100 REM DRAW TYPE 3 OR 4
XN 3110 LQ=X+I:FOR LP=Y TO YC:COLOR 1:LQ=
   LQ-I:PLOT X,LP:DRAWTO LQ,LP:COLOR 2:PL
   OT LQ,LP:PLOT LQ-I,LP
CE 3120 NEXT LP:LQ=LQ-I
WK 3130 FOR LP=YC TO Y1:COLOR 1:LQ=LQ+I:P
   LOT X,LP:DRAWTO LQ,LP:COLOR 2:PLOT LQ,
   LP:PLOT LQ-I,LP:NEXT LP
AP 3140 RETURN
WF 3200 REM DRAW TYPE 5
VU 3210 COLOR 1:FOR LP=Y TO Y1:PLOT X,LP:
   DRAWTO X1,LP:NEXT LP:COLOR 3:PLOT X,Y:
   DRAWTO X1,Y:PLOT X,Y1:DRAWTO X1,Y1
MH 3220 COLOR 2:PLOT X,Y:PLOT X1,Y:PLOT X
   1,Y1:PLOT X,Y1
AO 3230 RETURN
CN 3250 ? "ERROR TRYING TO DRAW THE HOLE"
   :? "PLEASE EDIT AND TRY AGAIN":GOTO 22
   30
```

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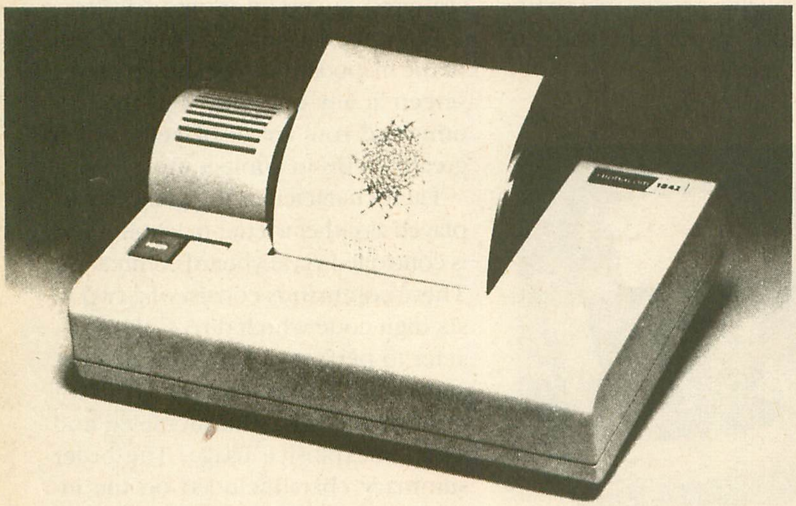
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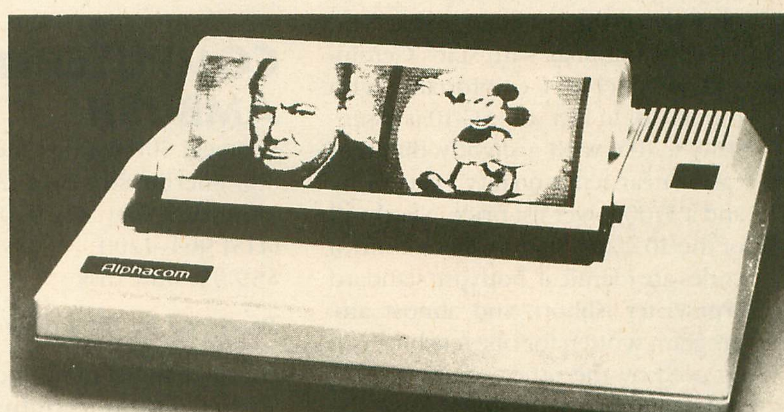


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# product reviews

## STAR SG-10

Star Micronics
200 Park Avenue
New York, NY 10166
(212) 986–6770
$299.99

*Reviewed by Charles Jackson*

Star Micronics' new **Star SG-10** is a dot-matrix printer to get excited about! Offering both speedy draft quality and great-looking "near letter quality," the SG-10 is a worthy successor to Star's deservedly popular Gemini 10X which had printed out **Antic's** listings for the past six months or so.

In "near letter quality" the SG-10 print head passes over each line twice. During the first pass, the print head runs the top half of a line. Then it returns to the left margin and fills in the bottom half. The "near letter quality" mode can be activated with control codes or by a DIP switch on the side of the printer.

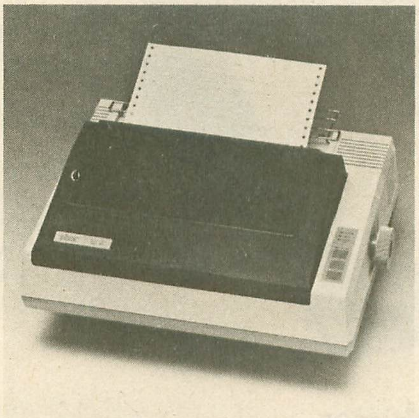
People familiar with Star's Gemini 10X will feel very comfortable with the SG-10. In fact, the SG-10 is essentially a 10X with a slightly different case, "near letter quality" capability and a $100 lower list price. Nearly all of the 10X and SG-10 printer control codes are identical, both use standard typewriter ribbon, and almost any program written for one machine can be used by the other.

**Antic** has successfully used the SG-10 with AtariWriter, PaperClip, HomePak, Letter Perfect, Print Shop, and every program from our March 1985 Printer Issue, except "Font Maker" (You'll find the fix in this issue's listing section. We had to correct for a 3-byte downloading difference.) We also used the SG-10 "near letter quality" to prepare all the program listings in this issue!

**Antic** bench tests clocked the SG-10 at 91 characters per second, or about 15 percent faster than the Gemini. In "near letter quality," the SG-10 printed at 22 cps.

The SG-10's 238-page manual is clearer than the Gemini 10X manual was, but it's still not very well organized and lacks an index.

Luckily documentation is not that crucial here. The SG-10 is an extremely versatile, reliable printer that's also simple to install, easy to learn and fun to use.



## COMPUTER AMBUSH

Strategic Simulations Inc.
883 Stierlin Rd., Bldg. A-200
Mountain View, CA 94043
(415) 964–1200
$59.95, 48K disk

*Reviewed by Dr. John F. Stanoch*

Four years ago I came upon a full page ad for **Computer Ambush** in a popular wargaming magazine. By the time I finished reading about the game, I was salivating to play it. However, at the bottom of the ad I discovered that Ambush was only available for the Apple.

Recently I was happily surprised to see that SSI had released an upgraded and revised edition of Computer Ambush for the Atari. In this squad-level game, you are given command of one to ten men in simulating various small unit actions in WWII France.

The non-scrolling multi-screen map depicts a typical village in the French countryside. One can immediately see that this is an Apple conversion, for the buildings and structures are drawn with white lines on a plain black background with only a tinge of faint color sparsely scattered in certain terrain features.

Only about one third of the length of the mapboard can be shown on the screen at any one time. But the column and row are displayed, which greatly helps in combat movements.

Each character in the game is displayed as either a letter or symbol and is controlled via keyboard commands. These commands consist of a two to six digit code which directs the character to perform a particular kind of action including various types of movements, observation, melee, and weapon/explosive usage. The order summary chart included on the included Squad Cards is an invaluable aid.

Each action takes a specific amount of time to perform. After all the commands by both players are given, the actions are simultaneously executed during the computer resolution phase. Afterwards, a player will sometimes be in store for some very nasty surprises.

There are five solitaire and six two-player scenarios with the computer able to play either the American or German side. To win, the player must attain certain conditions specified in the given scenario. These vary from securing the village from enemy troops to staging a successful ambush. There is also an option allowing the players to generate their own scenarios.

This is a difficult game to learn. It took me nearly two hours to digest the twenty-page manual and understand the commands well enough to play somewhat competently. However, the eleven pages of rules are very clearly written, with numerous examples of play.

# product reviews

Also, an introductory scenario is given with suggested first turn commands for the American (noncomputer) player. New players will find it helpful to study and try to understand these first turn commands before issuing their own.

The last eight pages of the manual are devoted to American and German soldier dossiers. I highly recommend for every player to read these after attempting a game or two. Then the soldiers will no longer be just letters and symbols on the screen, but will become actual *characters* whose lives depend on your decisions.

Although this is a difficult game to learn, the player is rewarded with a wealth of options and decisions after mastering the rules. Because this game simulates man-to-man combat in such detail, it could appeal to both wargamers and role-players.

## MICROSTUFFER

Microbits Peripheral Products
225 Third Avenue, SW
Albany, OR 97321
(503) 967–9075
$149.95

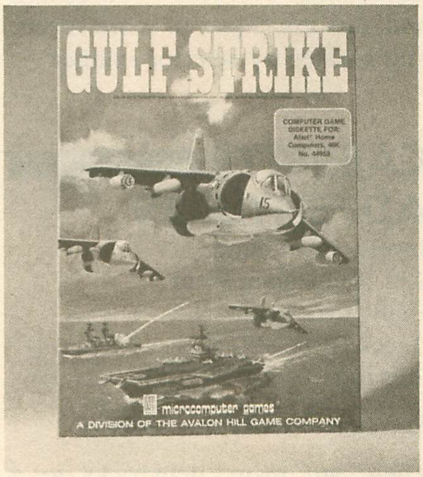
*Reviewed by Michael Ciraolo*

With a 64K printer buffer like this MPP product, your printer can produce hardcopies of vast reports or programs while you're working at your computer on something entirely different.

The **Microstuffer** works with any printer, and features a clear button, multiple copy repeat function and a full set of self-diagnostic test procedures. A Centronics parallel connector is standard and a serial RS-232 port is optional.

The crew from MPP thoughtfully included complete pin diagrams for their buffer just in case you ever need to make another cable. There's also an extended self-test feature that checks each chip and connection. The buffer comes with a one year warranty against defects in material and workmanship.

What else can we say? **Antic** is currently using a Microstuffer regularly and it works. It holds a whopping big file in its memory. Frankly, aside from bells and whistles, once you've seen one buffer. . .




## GULF STRIKE

Avalon Hill
4517 Harford Road.
Baltimore, MD 21214
(301) 254–9200
$25, 48K disk

*Reviewed by Dr. John F. Stanoch*

One of the hottest flashpoints in the world today is the Persian Gulf. Any conflict occurring here would have a profound effect on the course of history. With this new computer wargame from Avalon Hill, one can explore such a conflict.

In **Gulf Strike** you are faced with directing a combined Iranian/US pro-Western Arab defense against a Soviet and Iraqi invasion.

With a joystick you scroll through a multi-screen high resolution map which depicts most of Iran and all of the Persian Gulf, in 17 different types of terrain. A very nice touch is that you can stack any number of ground, air and sea units. However, orders can only be given to the top 19 units.

In order to win, the US/Iranian player must prevent the Soviet/Iraqi player from capturing nine out of 21 victory point squares within 25 turns. These squares consist of strategic towns and locations, such as Tehran and Oman Point. The game can be won anytime before the 25th turn. The computer then displays the number of enemy hit points each side has eliminated. In the one-player version, the computer plays the Soviet/Iraqi side.

The 44-page instruction manual is both well-written and complete. Although this is not a very hard game to learn, it is difficult to master. A player must not only place the combat units effectively, but also must be constantly aware of the overall strategic situation.

Experienced wargamers would welcome this complexity as something they can really bite into. A complete 25-turn game can take 15 to 20 hours, even though the box states that playing time is one to five hours. The game save feature is a definite necessity.

As with almost any other game, there are a few problems. There are no zones of control and the Soviet/Iraqi player moves after the US/Iranian player, but before combat takes place. So therefore the invaders can move away from the US allies and avoid combat. Also, during the course of one game a "ghost" US/Iranian unit appeared which was able to move but not attack.

I thoroughly enjoyed playing this game. Because of its complexity, I don't recommend Gulf Strike for anyone unfamiliar with wargaming. But to a wargamer, I cannot recommend it highly enough.

continued on next page

# product reviews

## TRIVIA FEVER

Professional Software, Inc.
P.O. Box 533
Needham, MA 02194
(617) 444-5224
$39.95, 48K disk

*Reviewed by Michael Ciraolo*

The country's hottest software trivia game is now available for the Atari. **Trivia Fever**, already popular on most leading computers, represents the best in trivia games—as far as trivia goes. As a conversion for the Atari, it's abysmal.

The colors used are Basic Computer Pastels, including several likely to produce upset stomachs in squeamish viewers. The sounds will bring back memories of ballpark music.

Trivia Fever also has the kind of inane computer responses that should have gone out of style ten years ago: "Gee, you must be smarter than you look," and "That was a real tough one." Would you believe, "You must have had your Wheaties this morning?"

But compared to other programs reviewed by **Antic**, Trivia Fever offers the best trivia questions. Choose from serious (not inane) questions in history, sports, films and entertainment, geography, nature and animals, science and technology and famous people. There is also a choice of difficulty levels.

This game works with individuals or teams, and includes three different handicapping schemes to keep the Smart Alecs from ruining everybody else's evening.

Representative mid-level questions include: "Who finally won India's freedom from Britain? Who was the first President to send military advisors to Vietnam? What type of aircraft was first to complete a round-trip transatlantic crossing?"

The game is easy to play, provided you have a "Master of the Group," an individual selected by the players to operate the computer. Your Master will type in everyone's names, set handicapping levels, and tell the computer if the question was answered properly.

If you can tolerate the sound and graphics shortcomings, you'll find a very decent trivia game. In fact, you'll find two games—Trivia Fever can be played without the software. The game comes with a book of questions and answers, a pad of score sheets, and a Category Selector spinner.

## CASSETTE ADVENTURES

Level 9 Computing
229 Hughenden Road
High Wycombe
Bucks HP13 5PG
England

*Reviewed by Charles Cherry*

There are many drawbacks to a cassette-based system, but chief among them is that you can't run real text adventures. Let's face it, a computer without a cavern is merely useful. However, help is here at last from a most interesting place.

While traveling in England I ran across Level 9 Computing. It seems these people are the leading adventure game company in the U.K. They market a series of top notch games for home computers. But there are relatively few British Ataris with disk drives, so the games are released on cassette.

Sophisticated compacting has squeezed everything into 32K. After the cassette loads (over 10 minutes!), you enter a large world. You'll find over 200 rooms with detailed descriptions, a good parser with a large vocabulary, lots of creatures and a little humor. All in RAM. And since it does not have to spin a disk, responses are very fast.

There are presently 6 games available. The first one, **Colossal Adventure**, is a faithful recreation of the original "Colossal Cave" mainframe adventure game. But once you finish, the story expands with 70 more rooms that tie into J.R.R. Tolkien's *Lord of the Rings* trilogy.

The next two games, **Adventure Quest** and **Dungeon Adventure**, continue this "Middle Earth Trilogy" although each can be played as a stand-alone game. If you get claustrophobic in caves and dungeons, please note that Adventure Quest takes place outside.

Science fiction fans can explore **Snowball** and **Return to Eden**, two-thirds of the "Silicon Dream Trilogy." Snowball takes place on a giant spaceship taking 2 million cryogenically frozen colonists to a distant solar system. However, something has gone wrong and you are awakened to deal with it. This game has over 7,000 rooms and is already a classic in England.

Return to Eden is the story of the planet when Snowball arrives. I have not spent any time with it yet, but I understand it's a jungle planet and there's a character named Pepsy Koala. **The Worm in Paradise** will be out soon to complete the series.

The final game, **Lords of Time**, sends you into nine different epochs. You travel from the Ice Age to the Dark Ages to the Future. The worlds in each era are necessarily small, but this makes it an excellent beginning adventure.

Getting your hands on these games is an adventure in itself. You'll need to visit your local international bank and get a check drawn in pounds sterling. Each program costs 9.90 Pounds. At today's exchange rate that is about $12. This price includes airmail postage from England. You can get an entire trilogy for the price of one U.S. disk adventure.

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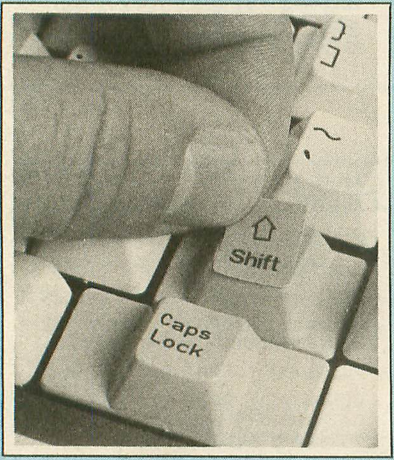


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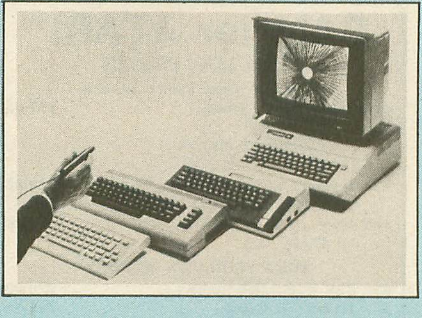
(software)
Videoware
19777 W. 12 Mile Road
Suite 180
Southfield, MI 48076
(313) 626-7208
$29.95
48K, disk or cassette

With only an Atari, your videorecorder and **Video Title Editor** it is now possible to record your own titles on videotape. Colored screens, leaders with snow or noise and custom messages can all be created.

## MAXWELL MANOR

(software)
Microcomputer Games, Inc.
4517 Harford Rd
Baltimore, MD 21214
(301) 254-9200
$25
48K disk

A solitaire graphics horror/fantasy game, **Maxwell Manor** features 100 variations and ten skill levels. The player attempts to find the Skull of Doom, which controls the manor, and to destroy the skull.



## SPACE TABLET

(input device)
Soniture, Inc.
2146 Paragon Drive
San Jose, CA 95131
(408) 435-0217
$150

The **Space Tablet** is a three dimensional input device. A receiver frame around your TV/video screen ultrasonically detects the position of a light pen type of transmitter up to six feet away. It then reports this information via a joystick port to the software. A sampler disk is included.

## BASIC PROGRAMS FOR ATARI 600XL & 800XL

(book)
TAB BOOKS, Inc.
Blue Ridge Summit, PA 17214
(717) 794-2191
126pp., 22 illus
$8.65 paperbound
$14.95 hardbound

A hands-on handbook, this publication guides you through 20 programs with the ultimate goal of showing you how to write your own applications in Atari BASIC.




## PAPER CATCHER

(printing aid)
Buddy Products
1350 South Leavitt Street
Chicago, IL 60608
(312) 733-6400
$49.95
Fits most printers.

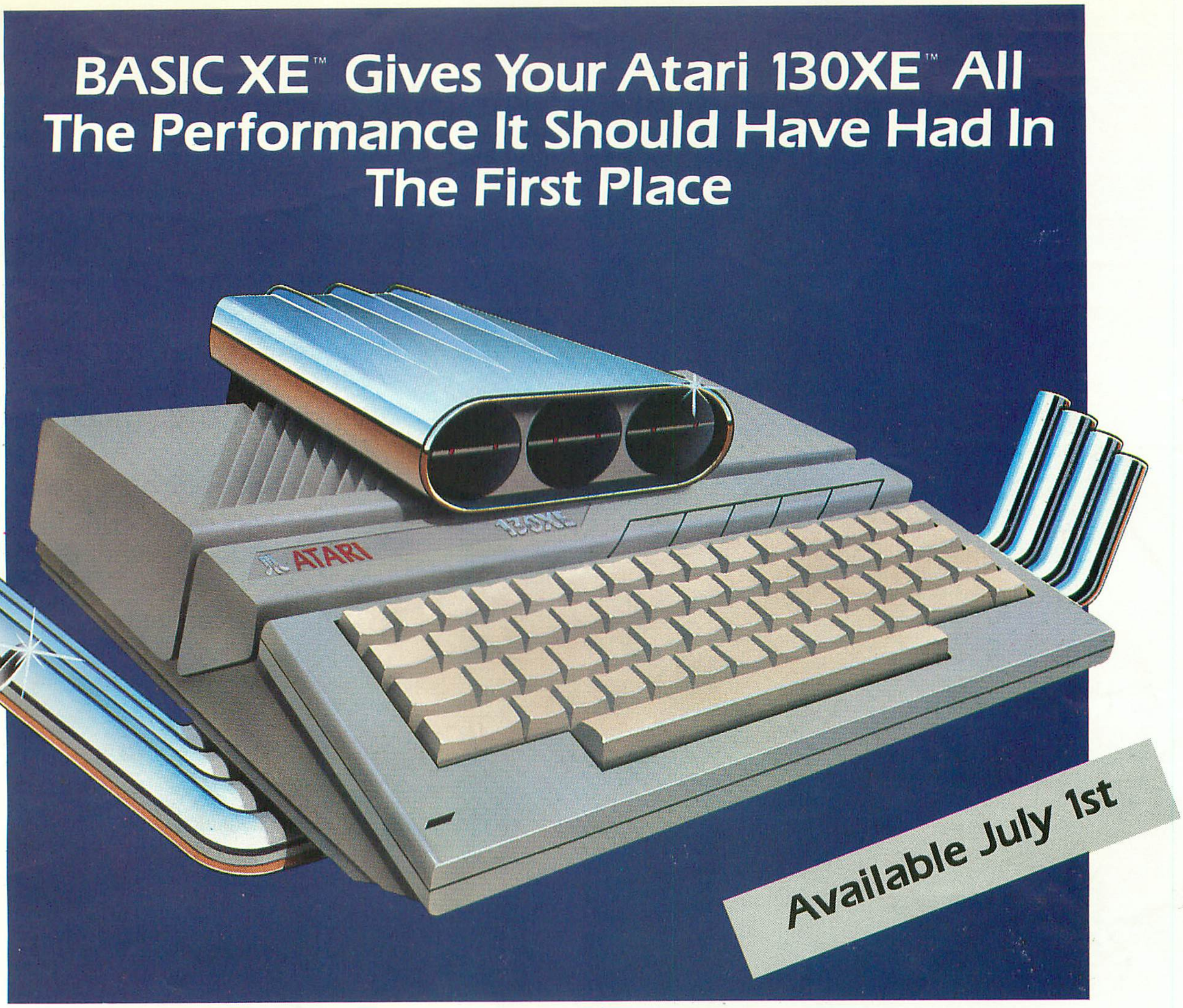
As the name suggests, **Paper Catcher** catches and stacks continuous feed paper. Placed on top of the printer, it can handle labels and checks as well as regular formfeed paper. It is conveniently produced in putty-colored plastic, for the fashion-conscious computerist.

## WISHBRINGER

(software)
Infocom, Inc.
55 Wheeler Street
Cambridge, MA 02138
(617) 492-1031
$34.95
48K disk

Scheduled for June release by the kings of all-text adventure, **Wishbringer** is a humorous and somewhat baroque entry-level interactive fantasy. The object is to find a missing cat using either "magic" (for beginners), or logic to solve the puzzle. Various evil characters complicate matters.

*Return the favor. When you call a manufacturer or supplier about a product you've seen advertised or otherwise mentioned in ANTIC, please tell them so. This will help us to continue to bring you the latest information about products that will make your Atari computer an even more valuable investment in the future.* —ANTIC ED




In the home computer races, the Atari 130XE stands out as a price leader. But using underpowered Atari BASIC™ on this otherwise fine machine is like racing in the Indy 500 with half your cylinders missing.

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